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The Far Eastern Review

ENGINEERING + FINANCE + COMMERCE
THE PIONEER IN ITS FIELD

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The Far Eastern Review

ENGINEERING

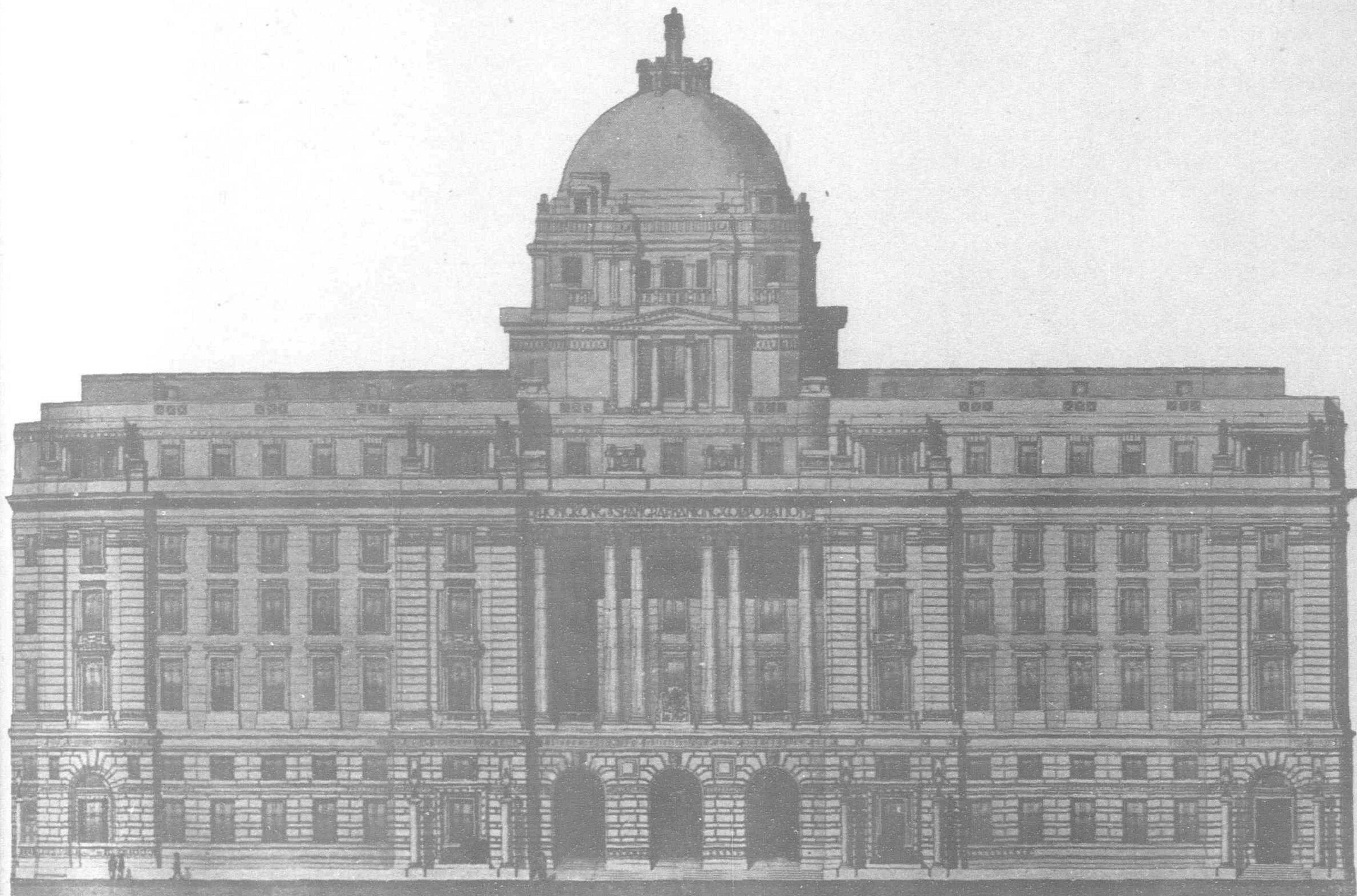
FINANCE

COMMERCE

VOL. XVII

SHANGHAI, JUNE, 1921

No. 6



How the New Bank Building will Look when Completed

“WAY-FOONG” The Olive Leaf

“And the Dove Came Unto Him in the Evening and Lo, in her Mouth was an Olive Leaf, Plucked Off, so Noah Knew that the Waters Were Abated from Off the Earth”

WND so, after weary months of drifting and tossing about in the sea of financial depression, “Way-foong” fulfills its mission to the merchants of China and brings to them the olive leaf, plucked off, the sign that the storm has abated, that sunshine is breaking through the gloom and the old ark of commerce will soon again find a safe resting place in quieter waters. The laying of a corner stone for the magnificent new home of “Way-foong,” coming as it does, during a time of industrial and commercial inactivity, is the olive leaf that symbolizes for the hongs of China that the waters of business depression are subsiding and that the future holds bright for those who have passed through the flood of hard times.

National lines fade away and disappear when one looks on the picture of the splendid new home of the Hongkong & Shanghai Banking Corporation now in course of erection on the Bund at Shanghai, and gives place to a feeling of genuine admiration for the pluck, perseverance, and intelligence, which in sixty years has developed and expanded the little treaty port commercial bank into the present magnificent financial institution, the strongest foreign bank in the British empire, one of the foremost in the world. It is not our purpose to review the history of the growth of “Way-foong” from its inception in the early sixties to its present proud place as the foremost British institution in China. To do so would be to record the history of the intervening years, of the

stubborn up-hill fight made by the British commercial pioneers who blazed the way to success against the passive, and at times active, resistance, of 400,000,000 people whose rulers were loath to open their doors to foreign commerce. The progress of "Way-foong" is the progress of British trade, British influence and British enterprise in China. British prestige owes much to the wide-awake yet conservative operations of this leading British bank, which, in turn, reflects upon the same characteristics of British merchants whose business the bank handled so successfully. British interests in China in many respects are so interwoven with the interests of the Hongkong & Shanghai Banking Corporation, that at times it is difficult for the layman to understand where one begins and the other ends. British railways in China owe their construction to the activities of the bank, shipping lines, mines and many industrial enterprises have been brought to their present state of efficiency through its support. In short, the name of "Way-foong" stands as the symbol of British far-sighted business intelligence which has won for them the premier place in the commerce of China and the entire confidence of the Chinese. In the far distant provinces, towns and villages of this vast country, the Chinese trader and merchant, who would never recognize the name of the Hongkong and Shanghai Bank literally translated, know and respect the meaning conveyed to them by the word "Way-foong," the symbol of a square business deal and upright financial transactions, a foreign bank which has lived up the Chinese merchants' traditional idea of commercial honor, whose word is as good as its bond.

Neither is it our purpose to review the financial history of the bank, except to invite attention to the fact that its capital was recently increased from \$15,000,000 to \$20,000,000, while its reserve fund stands at about \$42,000,000.

Nor will we review the speeches and tributes uttered at the ceremony attending the laying of the corner stone of the edifice, all bearing eloquent testimony to the esteem and confidence of government and merchants in this great institution. Our readers will be interested, however, in a description of the magnificent new structure that will stand as a permanent "Olive Leaf," a symbol holding out to the business community of Shanghai and the Far East, the promise that financial squalls of the future will be weathered in the same manner as the present disastrous gale.

The New Premises—A Lordly Building

The final design for the building is of even greater dignity and beauty than the preliminary design. The style has been changed to *Neo-Grec*, and the pleasing result is due to correct scale and proportions rather than to the introduction of elaborate carving and sculpturing. The height from the pavement to the top of the parapet has not been changed, but the large central dome has been raised, and the height is now 180-ft. to the crown. The building is being faced with Hongkong granite, full height, on all the principal facades.

The main entrance to the bank is in the centre of the Bund facade and consists of three arches, each 11-ft. wide and 20-ft. high, approached by a flight of steps 62-ft. wide. The key stones of these three arches are crowned with heads representing Agriculture, the source of all wealth, in the centre, with Industry and Shipping on either side. The bronze arches will be filled with bronze gates of particularly fine design. Flanking the flight of steps will be pedestals with two bronze lions, which are being cast from models prepared by Mr. Henry Poole, A.R.A. Three revolving doors in bronze will give access to the entrance hall from the outer portico. These doors are set in glazed bronze screens.

Symbolism in the Entrance Hall

The entrance hall is the principal feature of the interior; it is octagonal in plan, 52-ft. across, the shape of the dome spanning being of a novel design. It will be supported on eight detached Sienna marble columns with bronze capitals and bases. The spandrels between the arches and the walls below, and the whole dome above, will be in rich mosaic, the subjects being as follows :

Circular panel on ceiling:—Ceres, the Goddess of Plenty or Abundance : Helios the God of the Sun, and the horses and chariot with which he traverses the heavens : Artemis, the twin sister of Helios, the Goddess of the Moon, on her forehead the crescent : one-half of the background Day, the other Night : Border, inscriptions from the Chines classics.

Surrounding this panel are eight heraldic lions in gold, and geometric symbols in squares including the Swastika (good fortune), Solomon's Seal (wisdom), etc.

The signs of the Zodiac are placed in the following positions in the hall:—S. Aquarius ; E. Taurus ; N. Cancer and Leo ; W. Libra and Scorpio ; S. E. Pisces and Aries ; N. E. Gemini ; N. W. Virgo ; S. W. Sagittarius and Capricornus. These are shown on a dark blue ground wth wide gold borders.

Banking Centres of the World

There are eight principal panels in the hall, the decorative motif of which is the banking centres of the east and west. These will be worked out on the following lines:—

London—Central figure of Britannia with trident and British lion. On the left a figure with the City arms. On the right, a symbolic figure of the Thames with model of a ship. The background will show the Houses of Parliament and St. Paul's Cathedral from over the river, while the heraldry employed will be that of England, Scotland and Ireland.

Paris—Central figure of the Republic and tablet inscribed "Liberty, Equality and Fraternity." On the left a figure of the Arts with statuette. On the right, the city arms. Heraldry, the arms of the Republic and the fleur-de-lis. The background will show a view of the Seine and Paris, principally of the Cathedral of Notre Dame.

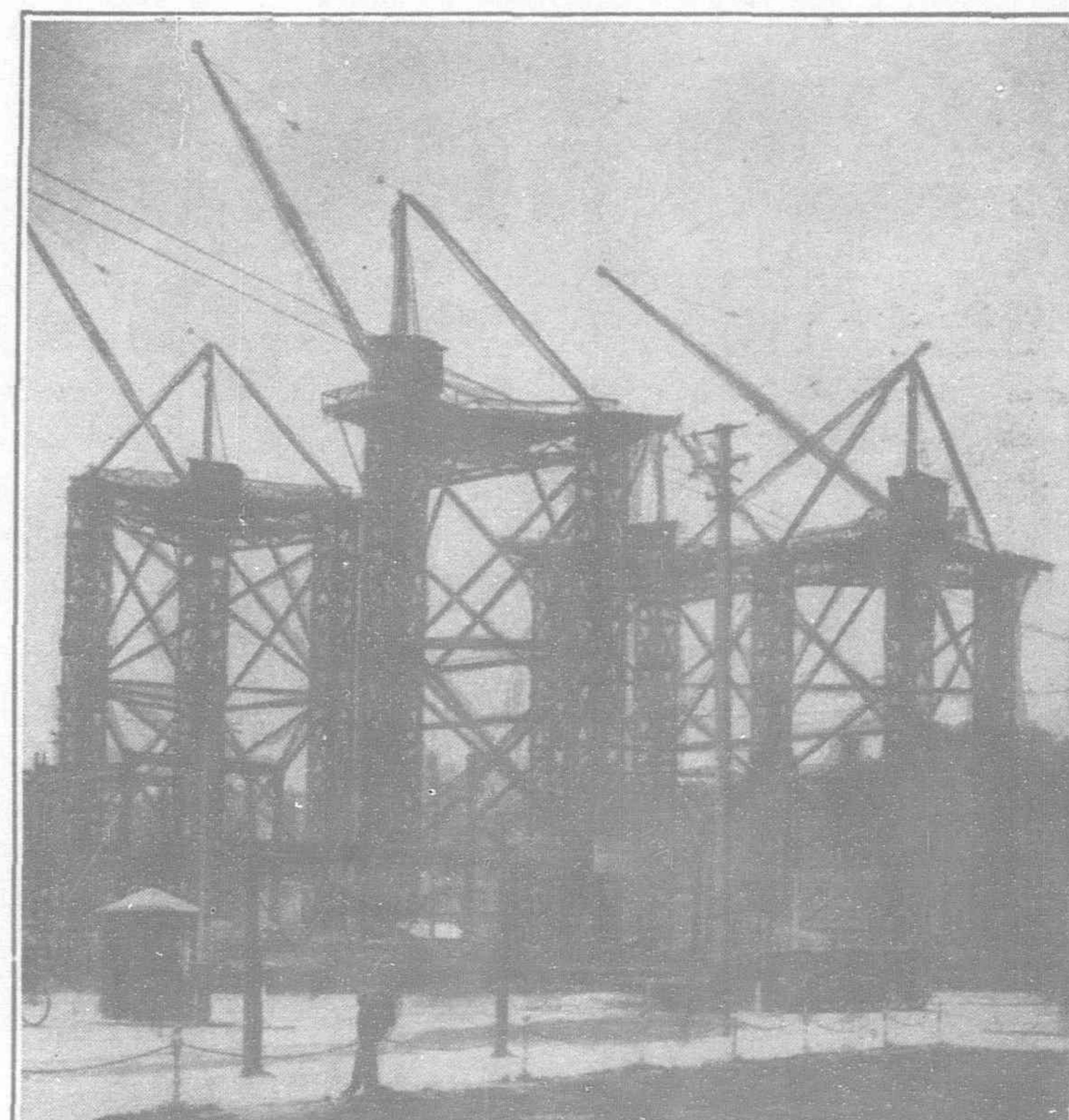


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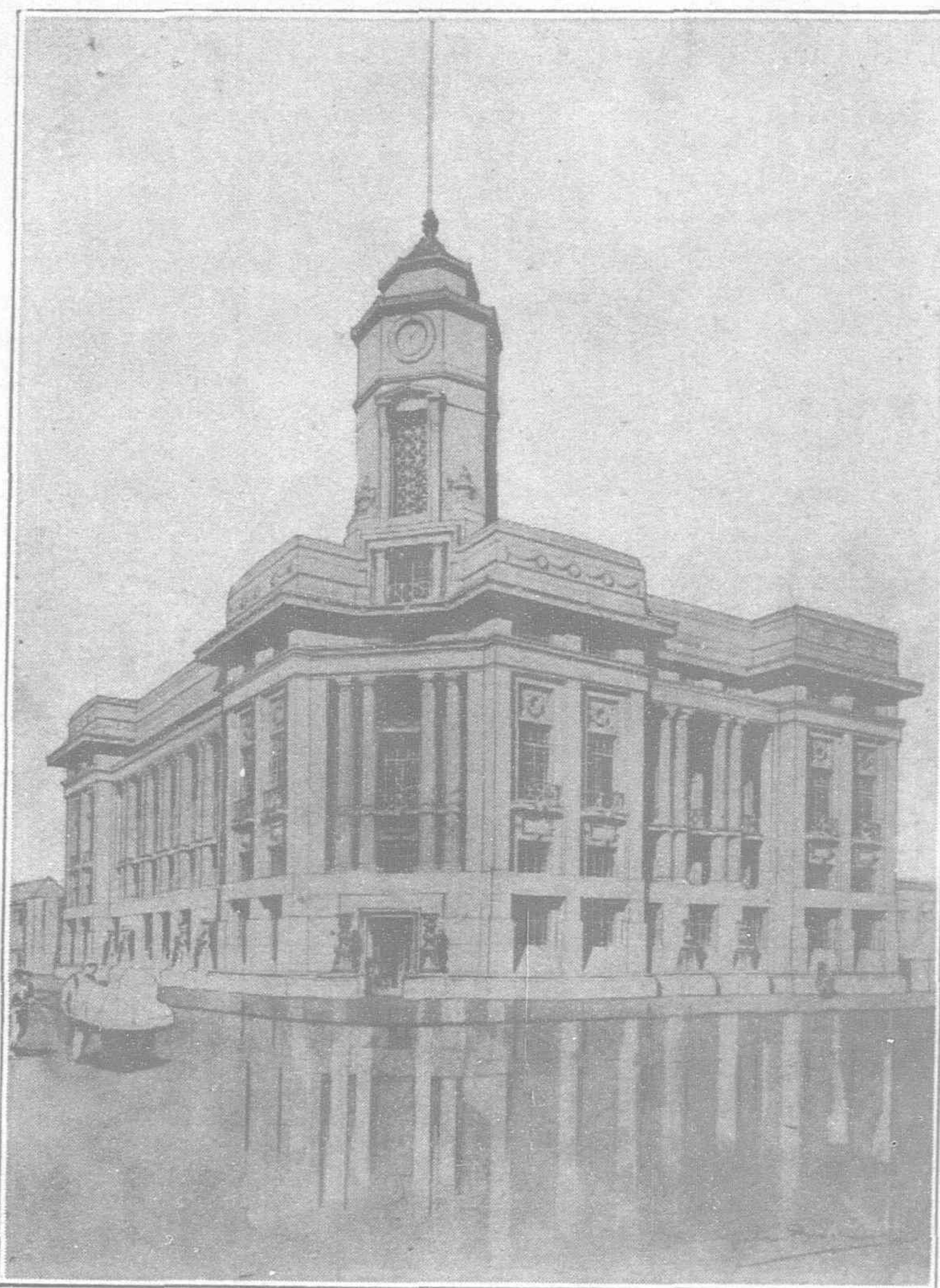
The Work of Construction

Four cranes, mounted on lofty towers, lift the material from motor lorries and place it in position, every part of the area being served in this manner

THE NEW HONGKONG & SHANGHAI BANKING CORPORATION BUILDING, BEING
ERECTED AT SHANGHAI



The Octagonal Entrance Hall



As the Building at Harbin will Appear

New York—Centre, Bartholdi's well-known figure of "Liberty enlightening the World." Left, Hermes, the promoter of social intercourse and commerce among men, with his symbols, winged hat and caduceus. Right, the national arms.

Bangkok—Central figure symbolic of the jungles and forests of Siam. Left, a figure representing hewers of timber. Right, a figure symbolic of agriculture and rice cultivation. Heraldry, a white elephant on a red ground. Background, a temple at the mouth of the Chao Phya Menam River (the Mother of Waters).

Shanghai—Centre figure, Foresight or Sagacity with Sextant. Left, symbolic figure of the Yangtze River. Right, shipping. Background, the Hongkong & Shanghai Bank and the Custom House from the river.

Hongkong—Centre figure with British flag symbolic of its becoming a British Crown Colony in 1842. Left, figure of Commerce. Right, figure suggestive of the Canton River. Background, Chinese junk and view of Hongkong from the harbor.

Tokio—Centre, figure of Learning. Left, youth symbolic of Progress with national emblem—the rising sun—on shield. Right, Science, with scroll and compasses. Background, view of city from the sea.

Calcutta—Centre, the figure of Mysticism. Left, Philosophy. Right, Trade with scales, and heraldic shield with arms of the city. Background, the Hugli River, High Court, etc.

Other Features

On the eight spandrels between the arches and pilasters are likewise symbolic figures, the subjects being:—Prudentia, Probitas, Historia, Aequitas, Temperantia, Justitia, Labor, Subtilitas, Fortitudo, Philosophia, Ordinatio, Fides, Veritas, Experimentia, Scientia and Sapientia.

The names of the principal branches of the bank are also shown and the dates of their establishment.

How the Rooms are Arranged

Turning now to the arrangement of the bank premises. On the left of the entrance hall will be the brokers' room, manager's room, private office, book and telegrams, stenographers' room, etc. On the right the accountant, coupon room, etc., and safe deposit.

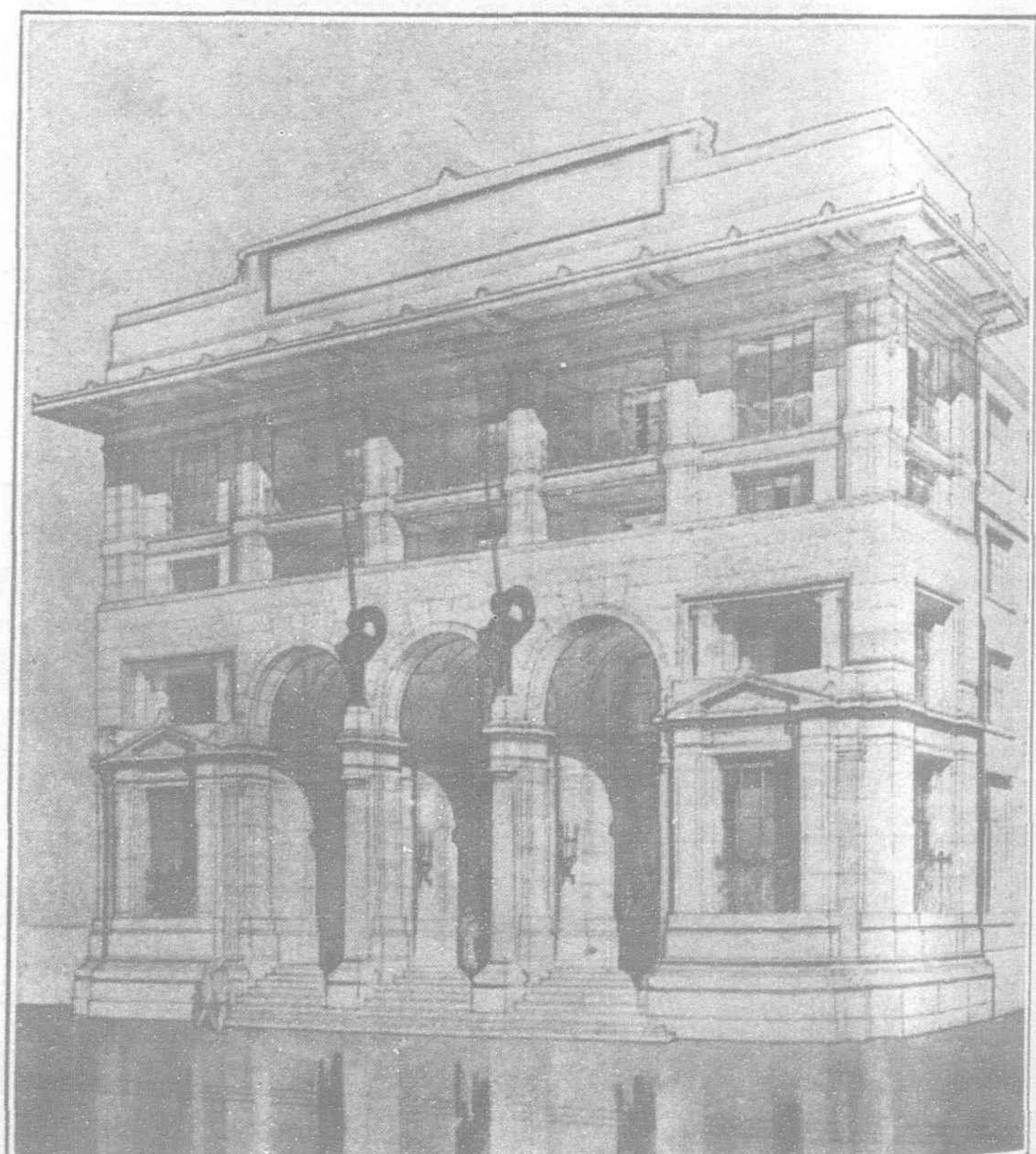
The main banking hall is reached by crossing the entrance hall. It consists of a very large hall, 21,500 sq. ft. in area with windows on two sides and large ceiling lights. Above this there is an outer light and provision for special protection from the sun in summer. The walls and columns will be faced with marble. The ceiling will be of fibrous plaster relieved by handsome bronze electric light fittings.

At the south end of the banking hall will be a marble staircase giving access to the mezzanine, where are planned the record room, stationary, telephone and changing rooms. At the north end of the hall there is a similar mezzanine making the hall symmetrical. Below the marble staircase at the south end of the hall there is another entrance to the bank on the Foochow Road. The counters will be faced with marble, finished on top with bronze grilles.

The Chinese banking hall is situated at the southwest angle of the building and provided with a separate entrance on the Foochow Road, but may also be reached from the main banking hall. The compradore's office and private room are contiguous to the Chinese banking hall. The savings bank has a separate entrance on the Foochow Road frontage.

The Treasuries

Treasuries are to be built at the northwest angle of the building with an observation corridor all round, giving storage for many million taels of silver. The doors will be of the latest fireproof pattern, and all the most up-to-date fittings for the protection of the treasury will be provided. In addition to the accommodation already mentioned there will be the shroffs' room, room for checking and packing sycee, room for despatch and receipt of chits, strong



A Perspective of the Future Dairen Bank

rooms for books, shipping documents, etc., and ample lavatory accommodation in convenient positions.

Suites of Offices

The upper floors are designed as suites of offices, with four staircases and six electric lifts giving access to same. Other staircases are provided for coolies and escape in case of fire. It is of interest to note that the outer walls of the lavatories are in most instances set back from the main frontage, forming verandahs so planned that the ugly soil pipes and piping generally will not be seen and mar the appearance of the building. The roofs are flat with ventilating chamber below which will ventilate the building in summer by introducing a current of cold air.

The finish of the building has been very carefully considered, special attention being given to keeping down the cost of upkeep and obviating, as far as possible, any disturbance in the business of the bank by periodical re-decoration. The construction is as fire proof as it is possible to make it. Very little wood has been used. The windows will be of steel and bronze. The majority of doors on the ground floor will be of bronze also.

Notes on the Construction

The foundations presented many difficulties, owing to the nature of the soil in Shanghai. The loads in the treasuries will be variable; when full of silver the weight will be very great, but at times there may be only small quantities of silver stored. The weight of the central dome is also great. To provide against movement below these concentrated loads, piles 40-ft. long were driven, and to equalize the pressure on the soil as far as possible the remainder of the site has also been piled but with wider spacing between the piles. The foundations consist of a reinforced concrete raft, spreading the weight over the whole site. The main beams of this raft are 7-ft. deep.

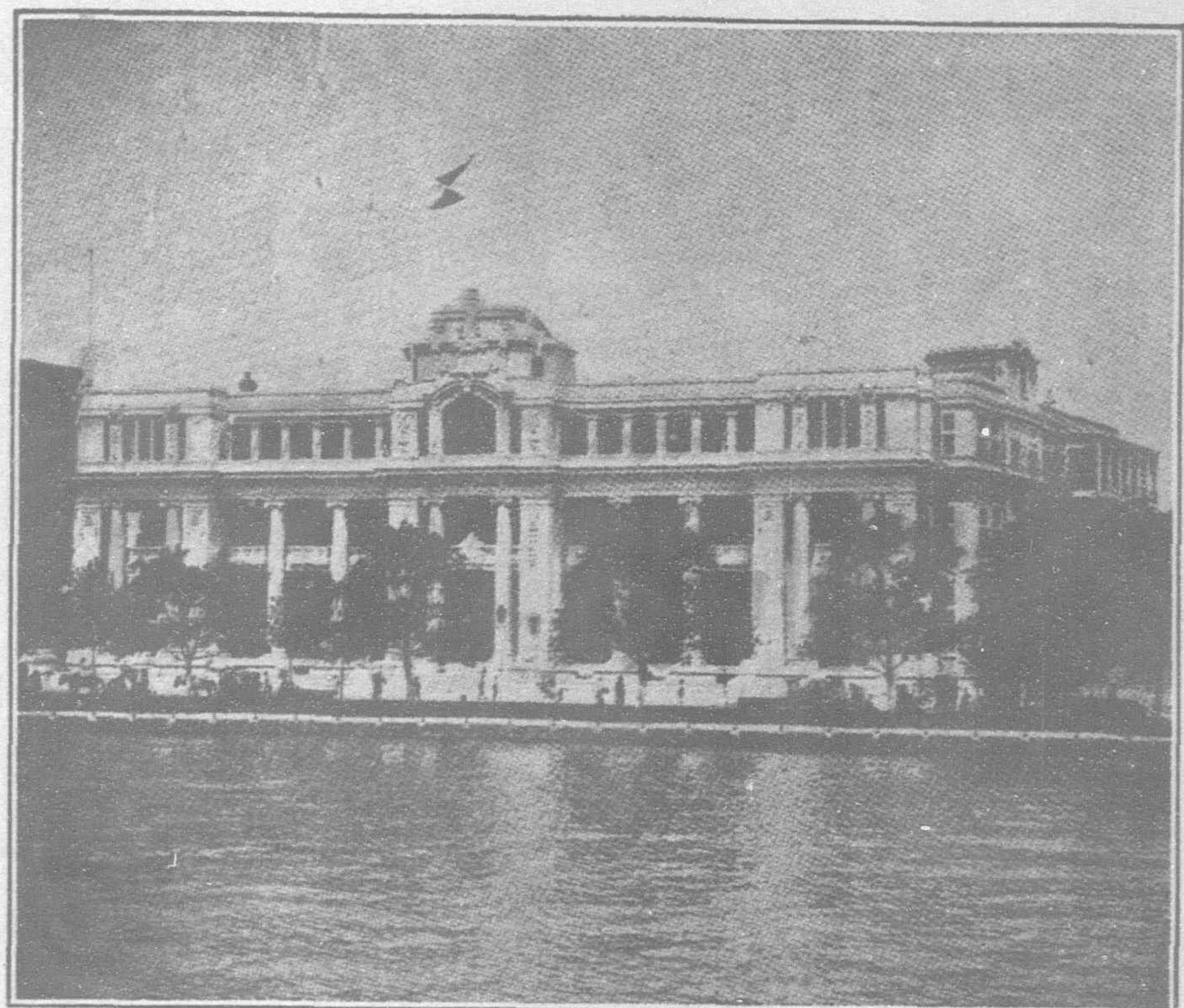
The spans of many of the steel girders in the building are greater than commonly used in Shanghai, some of them being 52-ft. long. The superstructure is of steel frame construction with reinforced concrete floor slabs. The whole of the steel will be encased in brickwork or concrete for protection against fire.

Modern Innovations

The most up-to-date system of ventilation and warming has been adopted for these premises. Fresh air will be drawn in at suitable points and washed by passing through a water stream. In winter this cleansed air will be warmed and pumped through a system of ducts into the rooms. The vitiated air will be drawn out through a separate system of ducts and discharged above roof level. The air in the building will be changed twice an hour during the winter and six times an hour during the summer. Ozone will be added to the air before it is pumped into the rooms. The offices on the upper floors will be warmed by a low pressure hot water system with the addition of exhaust ducts and fans which will ventilate the offices, the vitiated air being discharged above roof level.

The latest electric derrick cranes are being used to expedite the construction of the building. The steel jibs are 90-ft. long, and the four cranes are so placed that there is not a point on the whole site which cannot be reached by either one or other of them. Steel stanchions, girders, and material generally are brought alongside by motor lorries and lifted and placed in position by the cranes without noise or interference with the work on the site.

The bank when completed will be equipped with all the most practical features of modern buildings, the architects having made a special study of similar buildings in England and the United States before completing their plans.



"Way-foong" at Hankow

Those Doing the Work

No record of the building would be complete without reference to the architects and contractors. The architects are Messrs. Palmer & Turner, and in undertaking the construction of so great a building they resolved to introduce a firm of foreign contractors in order to ensure the quality of the work and speed in carrying it out. This scheme, which would do away with the eternal sub-letting of contracts, etc., which is a commonplace of building work here, was worked out by Lt.-Col. M. H. Logan, M.C., head of the Shanghai Office of Messrs. Palmer & Turner, and it is due to his initiative that we have seen what are to China new methods of construction. The immediate work of design is in the hands of Mr. G. L. Wilson, P.A.S.I., while the contractors are Messrs. Trollop & Colls of London.

In keeping with the high standard of design and construction of the new "Way-foong" building at Shanghai, although on a smaller scale, are the three buildings for the branch offices at Hankow, Dairen and Harbin. The Hankow building is already completed while the other two are in course of construction. Illustrations of these three buildings together with a brief description of their structural qualifications follow.

Harbin Branch

The above bank, which is now in the course of construction, occupies a fine corner site in the business district of Priestan Harbin and has frontages on the Polevaya and Vodoprovodnya.

The bank building, which is four stories in height together with a basement, is designed in the *Neo-Grec* style. The external elevations are treated in a simple and dignified manner, the authors relying more upon good proportion than over elaboration of detail. It has since been decided to dispense with the tower at the corner. The bank is entered at the corner and occupies the area facing the Polevaya with its southern aspect. The banking hall is carried up through two stories and has a balcony at the mezzanine level round two of its sides. Strong rooms are provided in the basement where also are placed the heating and electrical plants. The ground floor on the Vodoprovodnya front is occupied by Messrs. Jardine, Matheson & Co., who have their offices and showroom there. Over the bank hall and on the first floor Messrs. Butterfield & Swire have a combined office and flat whilst over the office

of Jardine, Matheson & Co., and on the mezzanine floor two bijou flats are provided for the junior members of the bank staff. The bank agent and the accountant are given the two flats on the second floor whilst the remaining flat on the first floor is planned for Messrs. Jardine, Matheson's agent.

Fire Resisting Construction

The building which is L shaped in plan has a three-storied Godown—built in reinforced concrete—in the rear. The bank building is constructed entirely in reinforced concrete and has been made fire-resisting. The outer walls are faced with artificial stone cast in blocks to represent stonework since it was impossible to utilize the local granite and the importing of Honan granite too expensive. The steel casements—supplied by Messrs. Crittall & Co., of London—are double throughout to cope with the severe winters and the heating installation—is on the high pressure vapour steam system. The contract for the lift and electric gear has been awarded to Messrs. John Richards & Co. The architects for both the Harbin and Dairen buildings are Messrs. Graham-Browne and Wingrove, A.R.I.B.A.

Dairen Branch

The above bank, which is also in the course of erection, occupies a good site on the Echi Gocho. The building is four stories in height with a basement for the strong rooms and heating and electrical plants. The bank entrance is placed centrally and the entrance to the offices and flats is on the west side. The plan is so arranged that the bank at present will only occupy about three-fourths of the ground floor area but should it be desired the whole of the ground floor can be used. The first floor will be devoted to offices. The second and third floors are to be used as flats, the bank's agent occupying the third floor. A flat roof garden completes the scheme.

The building is built in reinforced concrete and is made fire resisting. Steel casements—supplied by Messrs. Crittall of London—are double owing to the severe cold. Messrs. John Richards & Co. have been awarded the contract for the electric lighting and lift.

Town Planning in Malaya

SEVERAL months ago, says the *Malaya Tribune*, we published an exclusive article dealing with an interview with Capt. E. P. Richards, deputy chairman of the Singapore Improvement Trust, in which a rough sketch was given of the lines on which the Improvement Trust would work on town planning in this city. The article aroused a great deal of interest at the time among those who were concerned to see Singapore a much better laid-out city than at present, and we undertook to keep our readers informed upon the subject from time to time. It is now of special interest to know that Mr. C. C. Reade (a descendant of the famous writer of that name), an Australian government town planner, who has been lent to the F.M.S. for a period of twelve months, is collaborating with Capt. Richards, and the problems with regard to the lay-out of Singapore and the centres of the F.M.S., will probably be treated as a whole.

Town planning is not a difficult matter when the ground is "new," when there are open stretches to map out. A systematic lay-out in such a case becomes a matter of course. But in Singapore and the other towns of Malaya the ground has been built on for a century almost without any system of lay-out whatever. Dwellings and godowns have sprung up anyhow and anywhere, streets and open roads have for the most part been cut-out with consideration only for immediate convenience and gardens and recreation grounds—all too few in quantity—have been scattered about without any thought as to the necessities of growing generations. These facts present tremendous obstacles, but we are assu-

red, and we know the weight of the government is behind this, that they are not insurmountable.

Surveying the City

The government is contemplating vast changes in the future, especially with regard to the lay-out of Singapore. Capt. Richards has secured the services of a first-class man to help him in the survey of the city. It is being systematically divided into the proposed residential, business and recreation districts, and all the old survey plans, which are shockingly out of date, are being re-drawn and re-tabulated. Every part of the island is being examined with a view to its ultimate improvement. We are told that the way in which some of the godowns have been placed in Singapore, and the manner in which the unhealthy slums have been allowed to spread, is enough to fill the hearts of would-be reformers with despair, but the job is being tackled with enthusiasm on the part of Capt. Richards at least. A proper lay-out will be achieved even if it takes fifty years to complete it—there is no doubt it will take a long time. Capt. Richards himself thinks that in about ten years, perhaps less, we shall see substantial improvements.

The housing problem occupies a premier position in all these plans. Houses are being built at the present time under a watchful eye, with an ultimate idea of fitting them in with the orderly lay-out of the future. The building of godowns is under a never more strict supervision, in order to prevent them encroaching upon intended residential quarters. Of course, landlords and the building interests, as expected are creating difficulties with their undoubtedly selfish objections, and, with the municipal and government records of the past, there are many misgivings as to how far they will be allowed to impede town planning. We know that in one or two concrete instances already Capt. Richards has succeeded in stiffening the backs of the authorities to good effect, such as in the proposed coastal road from Johnston's Pier to the docks. The governor himself showed that he was not lacking in ideas of progressive reform in consenting to allow the proposed Clemenceau-avenue to be taken through the grounds of government house.

Big projects are being planned, while the constitution of the Improvement Trust is being incorporated in a bill to be brought before the legislative council. This bill is almost completed and may form a big subject for debate when it is introduced. It will probably contain portions from the English and other town planning acts relative to the conditions in Malaya.

Growth of the Steel Corporation

The twentieth anniversary of the United States Steel Corporation calls attention to the remarkable development of the American steel industry. In 1920 the gross business totaled \$1,755,477,025, or three times that of 1902. But although in two decades the Corporation doubled its tonnage capacity, its proportionate contribution to the country's iron and steel output has declined steadily. In other words, monopoly conditions are further off to-day than twenty years ago. Since July, 1920, each month has shown a decrease in the unfilled orders on hand; the amount was 6,284,765 tons on March 31, 1921, against 11,118,468 tons on July 31, 1920.

The Corporation's active furnace list has been cut in two since January 31, dropping from 99 to 50 on March 31; at present, ingot production is between 35 to 40 per cent. of capacity. Rails are a conspicuously active item in present steel output. During March the Gary mill turned out 92,600 tons of rails, thus establishing a world record for this particular product. Some of the large independent steel mills during March booked a tonnage about 25 per cent. in excess of February. The cut in steel prices announced April 12 by the Corporation may do much to stabilize the entire industry.

The Chinese Banking Group

A New Power in China



SHANGHAI CHINESE BANKERS' ASSOCIATION

The front row, from right to left (all sitting): 1 Y. M. Chien, Manager, Bank of Communication; 2 Sun Heng-fu, General Manager, Ningpo Commercial Bank; 3 Yih Kwei-chu, one of the Directors of The Chekiang Industrial Bank; 4 Chong Teh-chu, one of the Directors of the Shanghai Commercial and Savings Bank; 5 Kiang Shiou-feng, Manager, Chung Hua Commercial and Savings Bank; 6 Nieh Yuen-fu, Manager, Salt Industrial Bank; 7 Shen Cho-shu, Manager, The National Commercial Bank; 8 Chiang Yi-chu, one of the Directors of the National Commercial Bank; 9 Yih Wu-shiao, Manager, The Continental Bank; 10 Li Fo-sun, Manager, The Chekiang Industrial Bank; 11 Chow Yung-foong, Assistant-Manager, Young Brothers' Banking Corporation; 12 Sun Chin-si, Manager, Chung Foo Union Bank.

The back row, from right to left (all standing): 1 Yao Chung-pah, Secretary, Chinese Bankers' Association of Shanghai; 2 Hsu Chi-chin, Assistant-Manager, The National Commercial Bank; 3 Yang Teng-fu, Assistant-Manager, The Shanghai Commercial and Savings Bank; 4 ; 5 Chen Lu-chen, Assistant-Manager, The Bank of East Asia; 6 K. P. Chen, General Manager, The Shanghai Commercial and Savings Bank; 7 Wang Kung-quan, Chief Accountant, Bank of Communications; 8 Wang Tze-sung, Assistant-Manager, Bank of Communications; 9 ; 10 ; 12 ; 13 ; 14 Woo Yung-cha, Assistant-Manager, King Cheng Banking Corporation; 15 ; 16 ; 17 Hsu Chong-sui, Editor, *Bankers' Weekly*; 18 Chu Pao-chien, Assistant-Manager, The Chekiang Industrial Bank.

13 ; 14 Woo Yung-cha, Assistant-Manager, King Cheng Banking Corporation; 15 ; 16 ; 17 Hsu Chong-sui, Editor, *Bankers' Weekly*; 18 Chu Pao-chien, Assistant-Manager, The Chekiang Industrial Bank.

WILE the consortium is marking time, awaiting the unification of North and South as a basic requisite for lending funds to Peking, the Chinese authorities have turned to the domestic money-lender in order to tide over their more urgent requirements. In the past, banking in China was more or less of a pawn-broking proposition where high rates of interest were offered for deposits and usurious rates exacted from the borrower. For this reason, it was most difficult to interest the native capitalist in government loans bearing a paltry five per cent. interest, when twenty-five or more could be readily obtained through time-honored channels of business. Invitation after invitation to the Chinese investor to purchase his government's railway and other bonds issued in the past by foreign banks, have been coldly declined. Apart altogether from the disinclination to place their money in these foreign directed enterprises which in



Feng Kun-kwang
President of the Bank of China

some cases impaired their sovereign rights, the astute Chinese, preferred to risk their hoardings in the old pawnshops and other purely native enterprises, where, despite official exactions, taxes, levies and other oppressive burdens, the profits were many hundred per cent. larger than the returns from these foreign railway and administrative loans to their own government. As long as such conditions prevailed, it was hopeless to expect that Chinese capital would be induced to come to the assistance of its government for the development of railways, industries, or reorganization purposes.

Came the war, and aside from the purely Japanese advances to the Tuan ministry, the foreign money market was closed to China. Little by little the government was more and more forced to seek accommodation from the native banks which had blossomed forth as a result of war prosperity, and conform to the traditional conception of proper interest charges. With an impecunious government always in the



Y. M. Chien

Manager of The Bank of Communications, Shanghai, and Vice-Chairman of the Shanghai Chinese Bankers' Association



Shen Cho-shu

Manager of The Chekiang Industrial Bank, Chairman of the Shanghai Chinese Bankers' Association



Chen Kwang-fu

Manager of the Shanghai Commercial Savings Bank, and ex-Vice-Chairman of the Shanghai Chinese Bankers' Association

market for short-term loans secured on treasury notes, the native banks made huge profits by catering to this business. A recent report on the operations of the native banks in Peking for the last business year, comes as a revelation of the profits accruing as a result of the government short-term borrowings. The rate of interest charged the government for these accommodations varies between 15 and 30 per cent. Not one of the Peking banks operated at a loss, while every employee received a substantial bonus at the end of the year, in some instances, to the amount of six times his salary. The following list taken from Chinese sources gives some idea of the prosperity of the Peking banks, whose business has been practically confined to government advances.

Name of Bank	Net Profit	Paid to Members for \$1.00
Tunglu	\$750,000	\$6.50
Hsinhua Savings	700,000	2.60

Name of Bank	Net Profit	Paid to Members for \$1.00
Talu	450,000	2.80
Hsinheng	650,000	2.70
Wuchu (Five races) ...	150,000	1.50
Tasung	250,000	2.80
Nengkung	150,000	2.50
Minghua	250,000	2.80
Chihchung	150,000	1.30
Paoshang	200,000	1.70
Yenyeh (Salt)	1,300,000	4.50
China	4,500,000	—
Communications	2,500,000	—

In the case of the last two banks the amount to be paid to members awaits the decision of the shareholders.

It is no wonder then that we read of the organization of new banks on all sides, a rush to get in on the ground floor and participate



F. S. Yih

Manager, The Continental Bank, Shanghai



Sung Han-chong

Manager of The Bank of China, Ex-Chairman of the Shanghai Chinese Bankers' Association



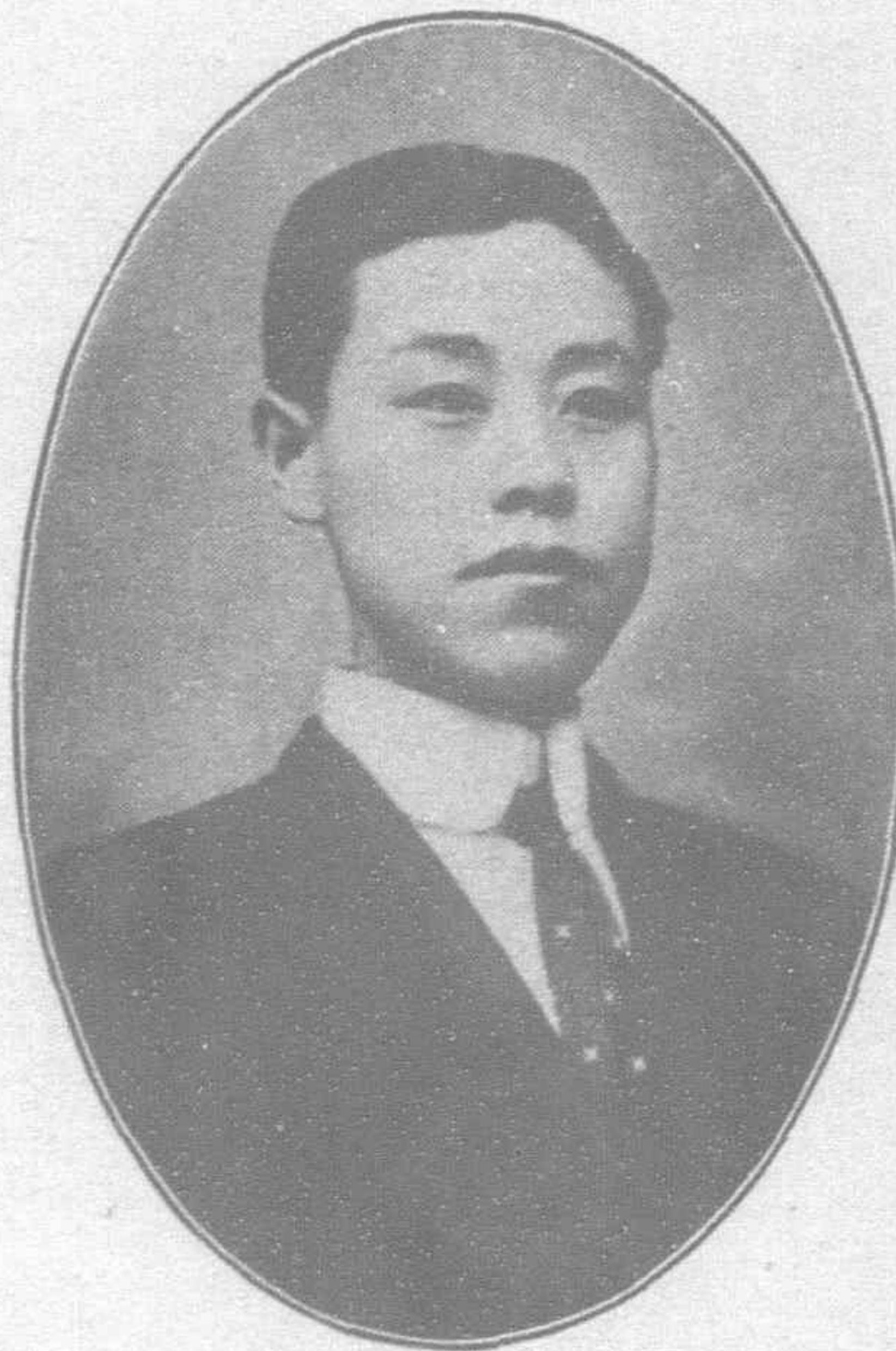
Woo Chai-chang

Sub-Manager, Kincheng Banking Corporation



Lin Ying-cha

Chairman of the Board of Directors of the
Hwa Foong Bank



Fan Shou-san

Manager, Hwa Foong Bank



L. S. Fan

President and General Manager of The
Continental Bank of Tientsin

in the cutting of the melon. It is only necessary to turn to the columns devoted to commercial finance in recent numbers of THE FAR EASTERN REVIEW, and count the new native banks being organized, to gather an idea of the wide-spread activities in this line. Following the precedent set by the Bank of China, Bank of Communications and the Salt Bank a Wine and Tobacco Bank is to be established, as the repository for taxes collected from these sources. We have Pawn-Brokers' Banks, a Commercial Silk Bank, Industrial Bank, Agricultural and Labor Banks, and so on, indicating a tendency on the part of the various guilds to have their own financial institutions. In addition, the shrewd Chinese officials, are casting an anchor to windward by encouraging the establishment of Sino-foreign banks, and to the original Russo-Chinese Bank, we now have a Sino-French Bank, a Sino-American, Sino-Italian, Sino-Belgian, a Sino-Danish-Norwegian, not to speak of various Sino-Japanese banks and industrial companies, all of which can be depended upon for short-term loans to a needy government.

Small loans from all these sources have been successfully floated from time to time and encouraged the government to hold out

against approaching the consortium for a more substantial advance. China has therefore been compelled to depend more and more upon her own resources to meet pressing obligations, and from this viewpoint, the consortium has undoubtedly been of inestimable value to the future of the country. Once the Chinese mandarin and medal-decked tuchun realize that civil war as a profession is unprofitable and must be paid for out of their own pockets, that foreign bankers cannot be cajoled or blackmailed into advancing huge reorganization or disbandment loans after each fresh revolt, there is hope that an end will come to these periodic disturbances which keep the country in a state of unrest and the masses in poverty.

As a result of the government's internal borrowings and a desire to keep the consortium from doing business the Chinese bankers have come together and formed a group for underwriting official loans. The organization of this group has been welcomed by the consortium who have invited its co-operation in the flotation of future government issues. The group is composed of the Chinese Bankers' Associations of Peking, Tientsin and Shanghai. Its membership is not fixed but adjusted to meet the various loan



Zung Lan-pu

General Manager, Tung-Lai Bank,
Shanghai



Head Office of the Tai Lai Bank, Tsingtao



Woo Wei-zui

Manager, Tung-Lai Bank, Shanghai



Shu Chin-min

Sub-Manager, National Commercial Bank,
Shanghai

propositions as they arise. For instance, the group who entered into the "Rolling Stock Loan" with the ministry of communications is composed of the following banks:—Bank of China; Bank of Communications; Sin-Hua Savings Bank; King Chen Banking Corporation; Pao-Shong Bank; The Continental Bank; Sin Hung Bank; Chung-Foo Union Bank; The National Commercial Bank, Ltd; Commercial Bank of China; Shanghai Commercial and Savings Bank; Chekiang Industrial Bank; Ningpo Commercial Bank; Tung-Lai Bank; Peking Commercial Bank; Dah-Sun Bank; National Industrial Bank of China; Tung-Lu Bank; Young



National Commercial Bank Building, Shanghai

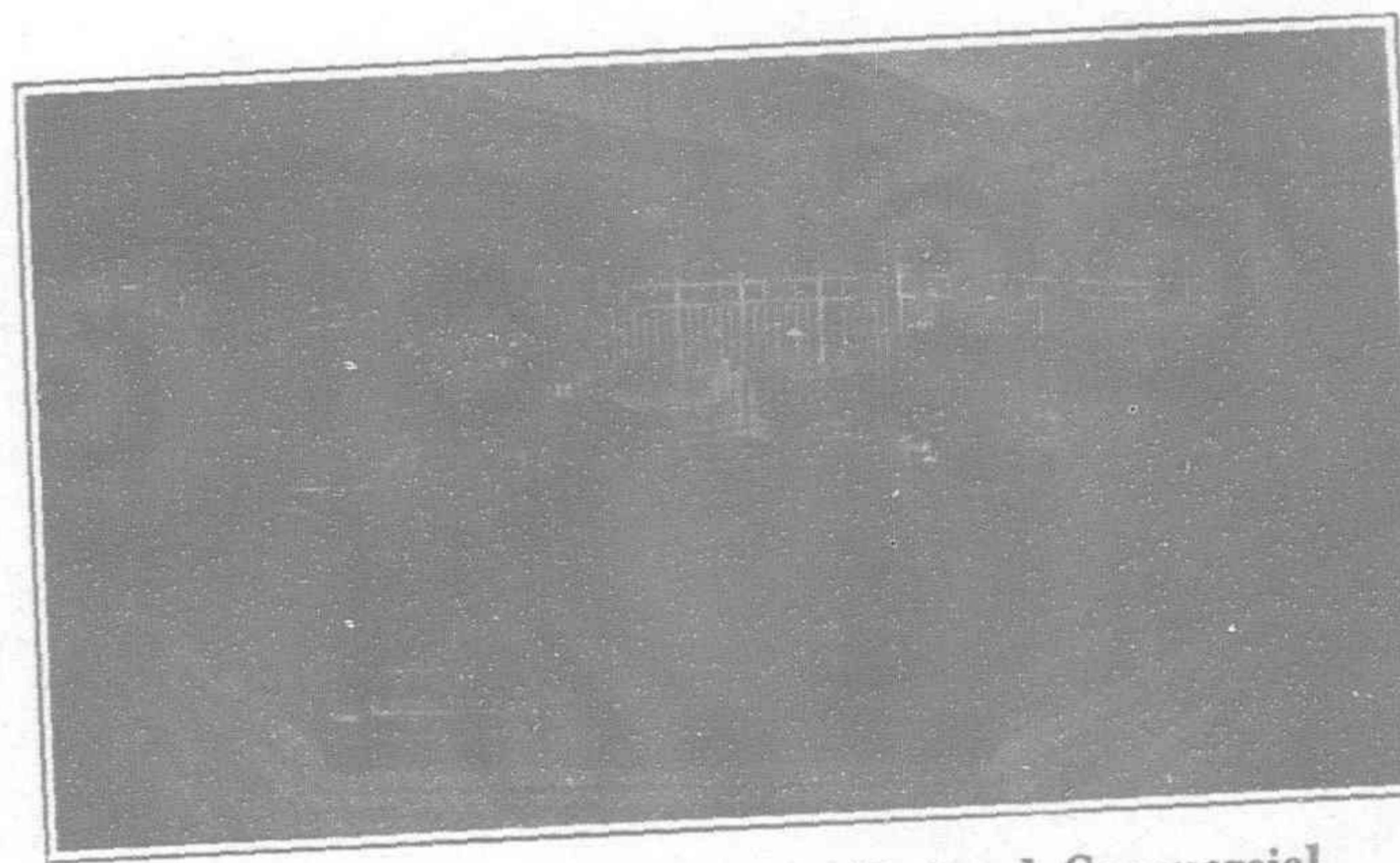


K. C. Yeh

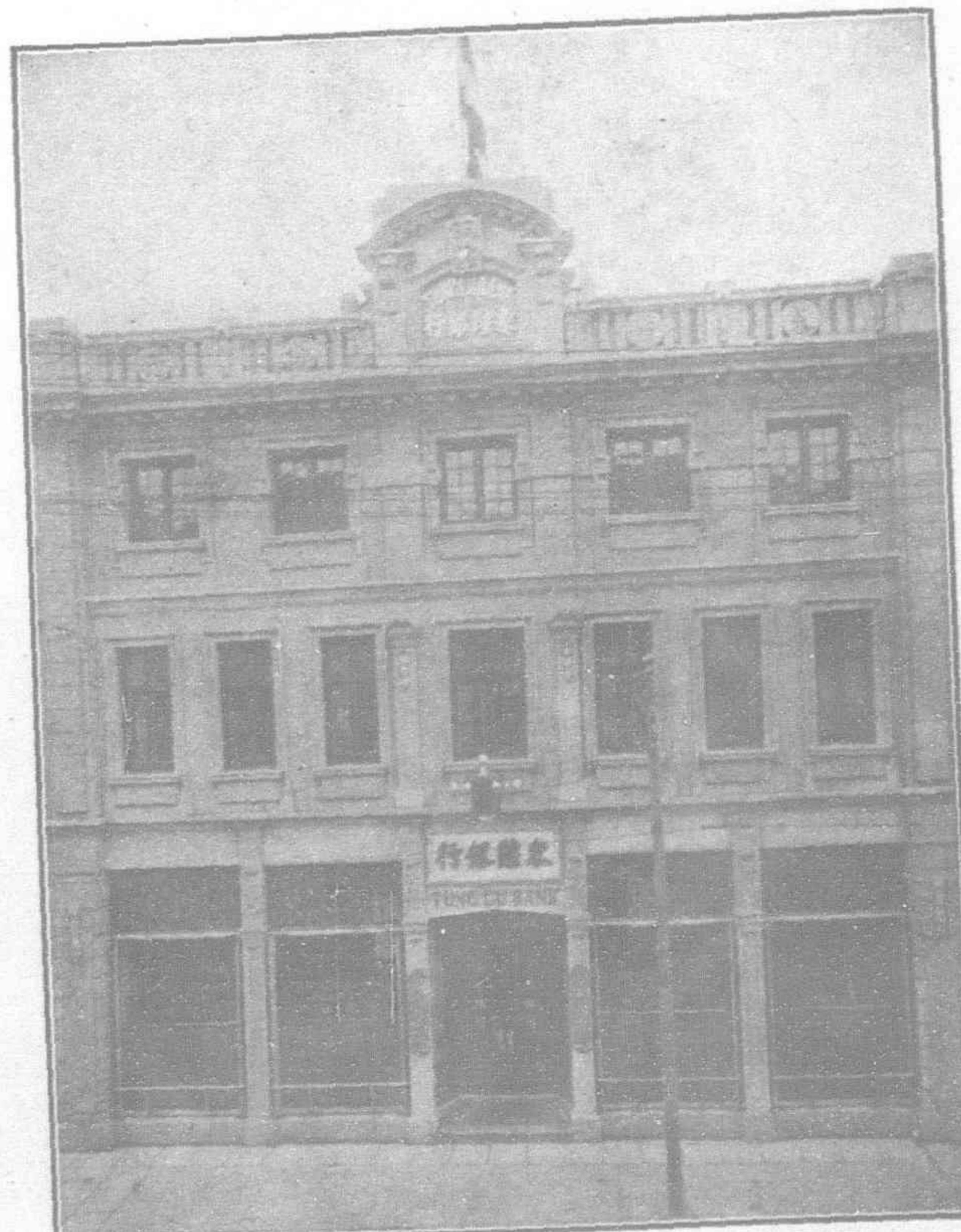
Chairman, National Commercial Bank

Brothers Banking Corporation; Dah-Wen Agriculture and Labor Bank; Chiu-Nih Bank; and the Pieh-Nih Bank.

The success attending the handing of these short-term government obligations has undoubtedly contributed more towards opening the eyes of the Chinese to the immense possibilities of modern banking than anything else, and although the group is not sufficiently strong to meet all the demands of the authorities, it has been able to stave off many serious situations. How long this can continue is difficult to say, but a test of its strength must arise during the present year as some of China's heavy outstanding



Banking Department of The National Commercial Bank, Shanghai



Tung Lu Bank Building, Shanghai.



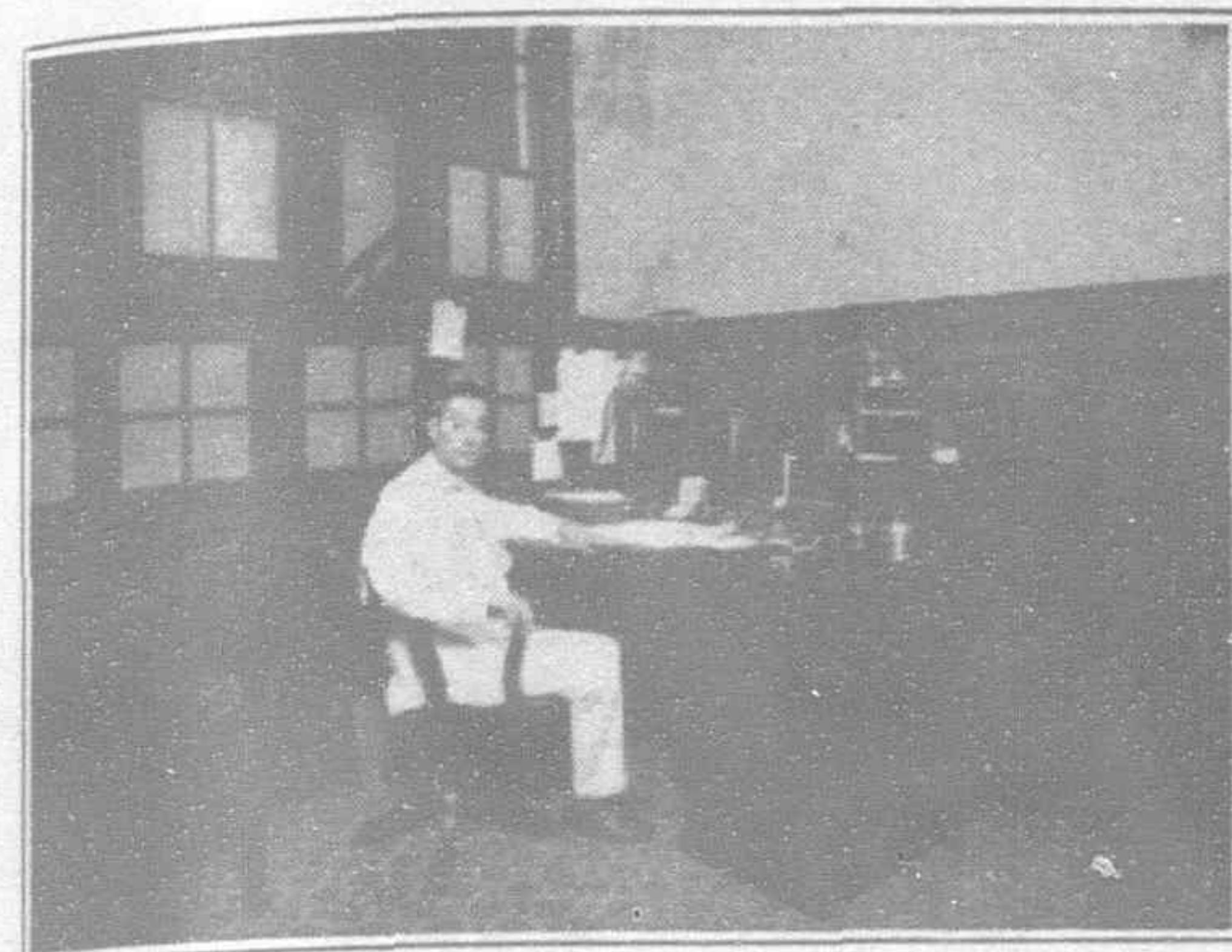
Chu Pa-fong

Manager, Tung Lu Bank, Shanghai



T. N. Lin

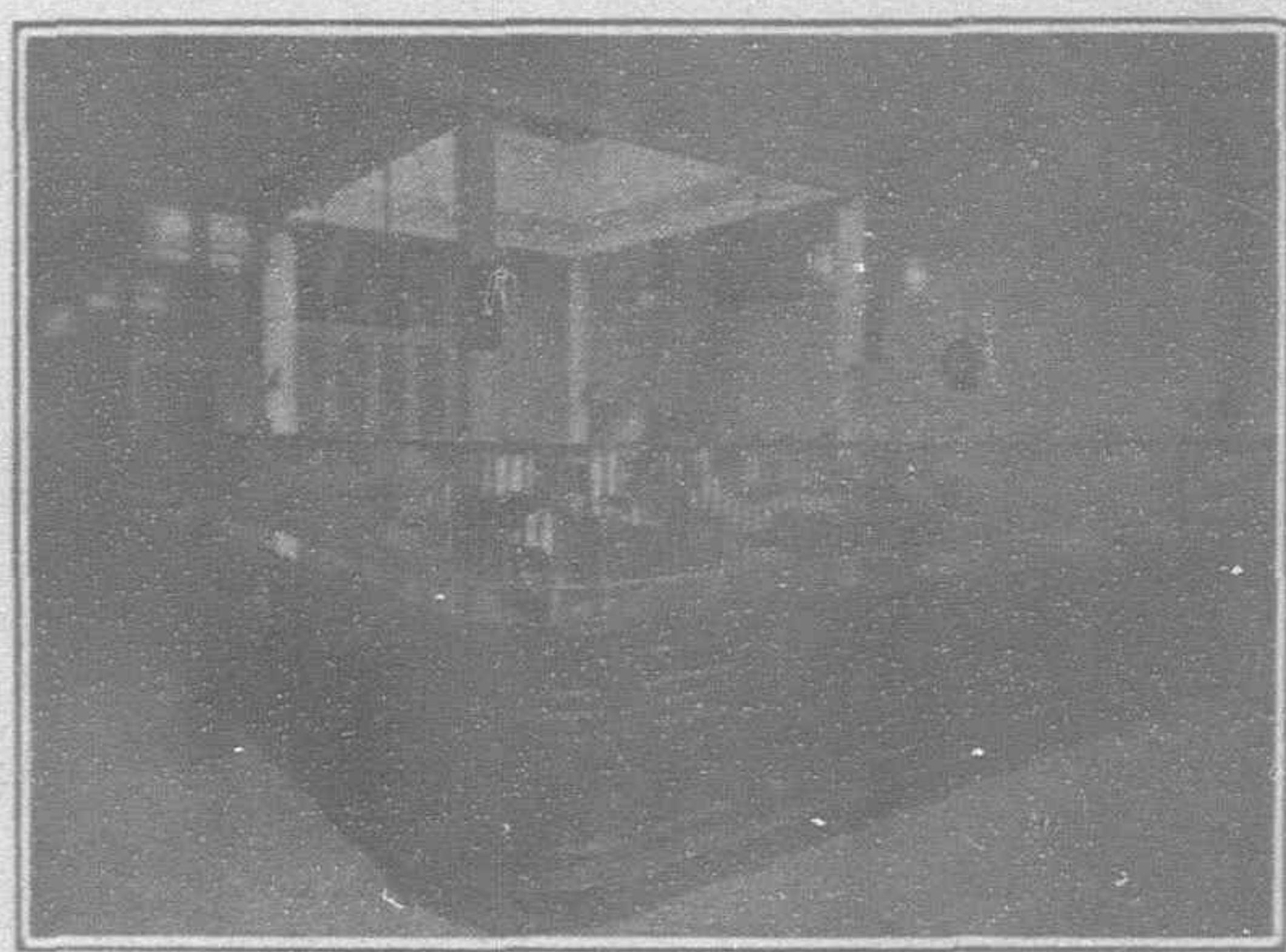
Sub-Manager of the Tung Lu Bank,
Shanghai



Manager's Office, Chekiang Industrial Bank,
Shanghai



Chekiang Industrial Bank Building,
Shanghai



Banking Department, Chekiang Industrial Bank,
Shanghai

obligations fall due. Although sufficiently strong to help tide over the government by short-term loans secured on treasury or revenue notes, it is hardly to be expected that the time has arrived when these Chinese banks could underwrite any considerable long-term loan whose bonds would have to be sold to the public at a low rate of interest. The fact that a beginning has been made in financing the temporary and pressing requirements of the government, is, in itself, a good augury for the future, and little by little with their growth, we may expect these Chinese banks to take an increasing participation in the more important financial transactions.

We are undoubtedly at the threshold of a new epoch in the Far East, in which it is not difficult to look ahead and foresee the day, fifteen, twenty years hence, when these Chinese banks expanding from their present humble position, will increase their reserves and capital, and dominate the business of their own country, and, as Chinese

merchants and manufacturers enter more and more into foreign trade with branches in other countries, the day must also arrive, when, like other nations, they will be followed by their banking institutions. This

may not have been part of the consortium program, but there can be no argument on the statement that the disinclination of this international group to lend money to China at this time has brought the official and capitalist class together in closer union to solve their own problems. This has been facilitated no doubt from the fact that for the past eight years most of the wealth of the country has been absorbed into the pockets of the officials, who, in turn, have invested the funds in new enterprises and banks.

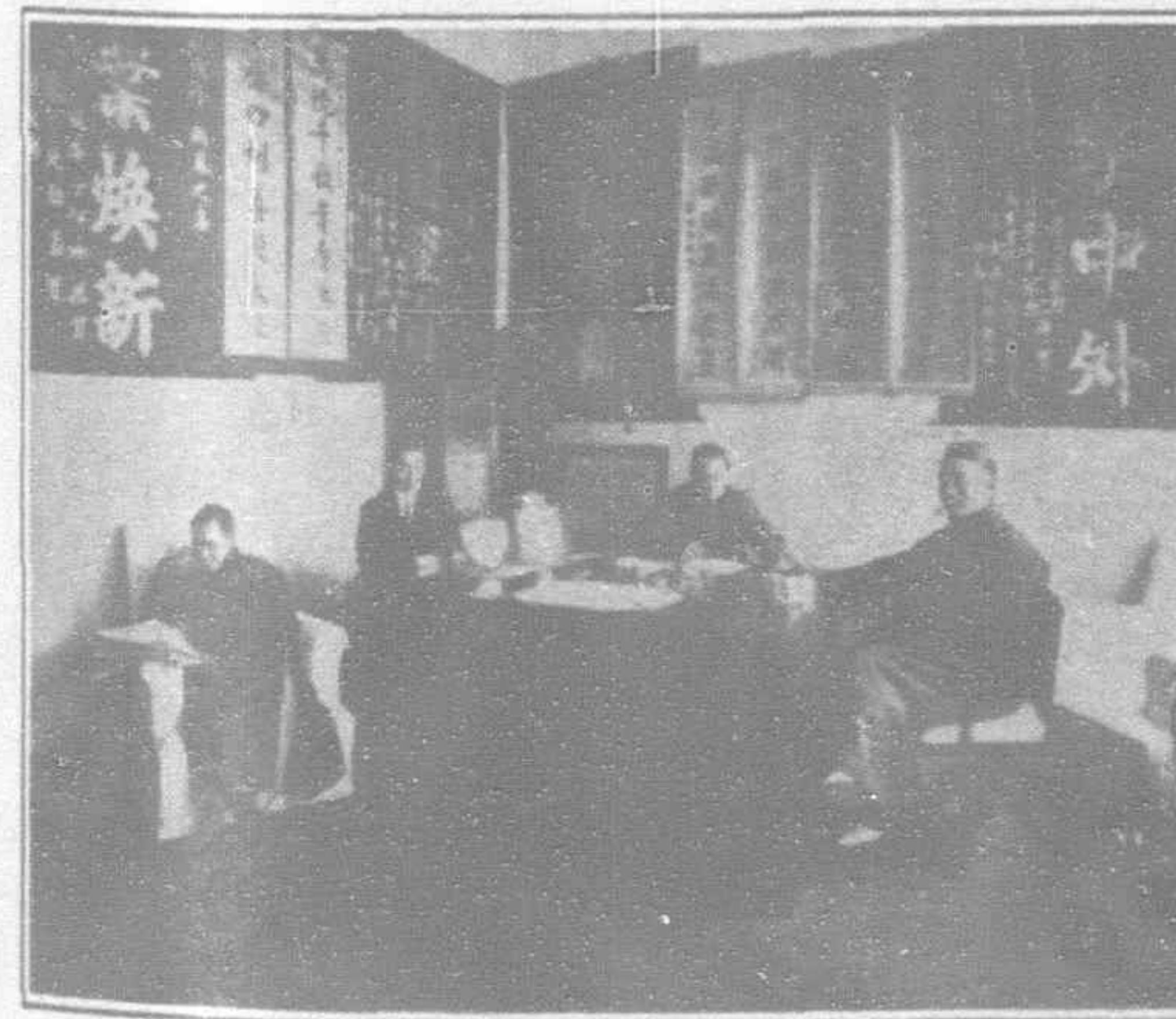
In many cases, it is clearly evident that Chinese private enterprises are but thinly disguised official undertakings financed by the tuchuns or other officials with funds squeezed from the revenues. Undoubtedly, a close community of interests exists be-



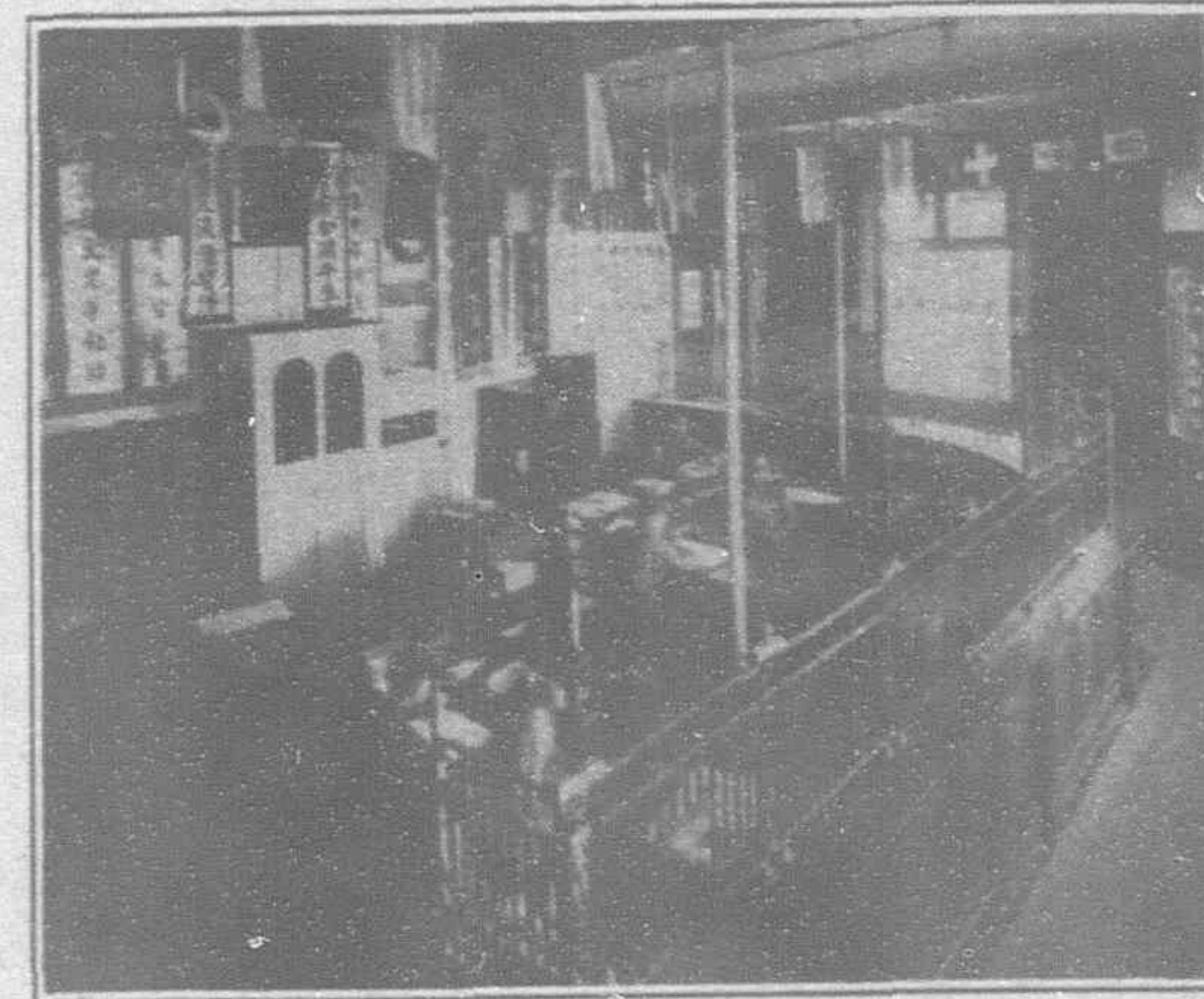
Head Office Building of the Young Brothers' Banking Corporation at
Chungking, Szechuan



Y. F. Chow

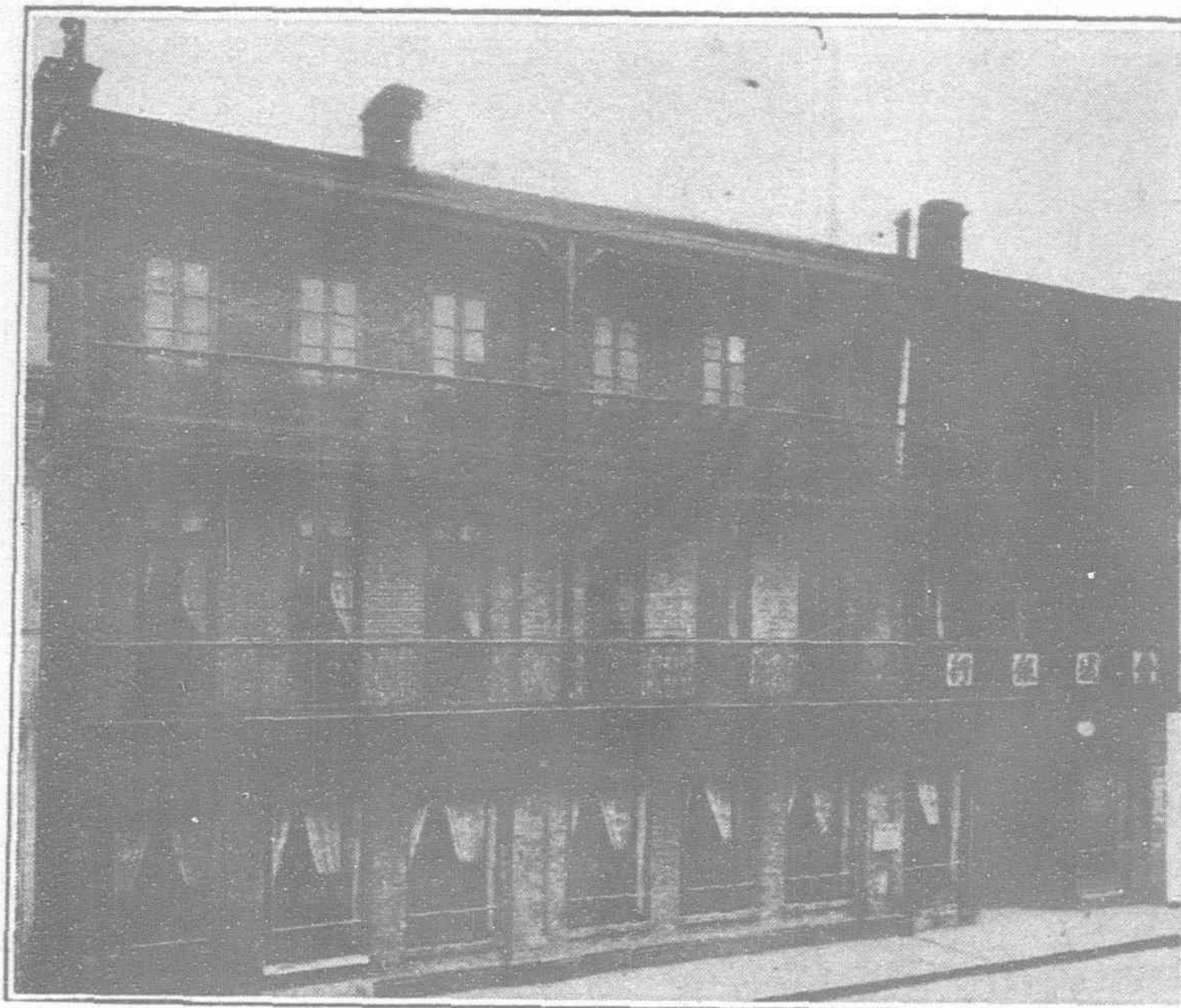


Manager's Office of the Young Brothers' Banking
Corporation, Shanghai



Manager, Young Brothers' Banking
Corporation, Shanghai

Banking Office of Young Brothers' Banking
Corporation, Shanghai



The King-cheng Banking Corporation

tween the officials and many of these new banks, but nevertheless, there is a sufficient element of the old conservative, dependable Chinese merchant class at the helm of these institutions that provides a guarantee of stability, if not pushed too hard by powerful official stockholders.

Notwithstanding the official element in the make up of the new banking organizations, it may safely be said that these banks have become a force that their government and foreign interests will have to reckon with more and more as time goes by. Already, they are taking an active part in suggesting and insisting upon reforms. Typical of this movement were the resolutions recently adopted at a Second United Chinese Bankers' Conference held at Tientsin, where 26 delegates representing the local associations of Tientsin, Shanghai, Hankow, Tsinanfu, Hangchow and Pengpu, met and discussed for three days the enactment of legislation and enforcement of reforms sadly needed to facilitate national financial reconstruction, and the organization of co-operative institutions amongst their own bodies.

The memorials passed for presentation to the government asking for new legislation give an idea of the intelligent trend of the movement. Among them we find, (1) legislation regulating the issuance of bank notes; (2) abolition of the tael unit in favor of the dollar; (3) exemption from transportation fees on all bank note and specie shipments from one bank to another; (4) cessation of the mining of the old style silver and copper currency; (5) revision and amendment of the banking laws and (6) enactment of laws governing the issuance of cheques and promissory notes. It was also resolved and passed by the conference that clearing houses should be established in the principal cities, constitutions of banking associations made uniform, a bureau of information established to ascertain the financial standing of business firms, and a standard technical terminology for banking business adopted.

In this conference, delegates from only six cities attended, but as the movement extends and the banks of Yunnan, of Szechuan, of Kansu, of Shensi and Shansi and the southern provinces, are brought into the union and lend the weight of their influence to good government, which in China is inextricably interwoven with finances, a power will be created that even the most stubborn and reactionary tuchun or war-lord will have to give heed to.

Following shortly on the heels of the above conference, the Shanghai Chinese Bankers' Association took independent action on the copper coinage scandal and telegraphed to the ministry of finance and the revenue department requesting (1) that mints be ordered to abide by the mining laws, (2) that copper coins be made of standard weight, (3) that only enough coppers for con-

sumption on the market be coined, (4) that secret minting be stopped, and (5) that the importation of coppers be prohibited.

That the foreign banks have awoke to the situation created by the rise of so many strong native banks, is attested to by a meeting of the Foreign Bankers' Association of Shanghai held recently to consider the advisability of forming an International Banking Association which will include all the Chinese as well as the foreign banks. As a result of these deliberations it is extremely probable that such an association will be formed. As the *North-China Daily News* truly comments in reporting the meeting "the importance of such a body can hardly be overestimated as the combination would be able to exert an influence on financial matters in China with such weight, that Peking or the provinces would have to take notice. The mere fact that such a combination has been favored at this time by the foreign bankers is, in itself, sufficient evidence of the great influence the Chinese banks are exerting in the financial field. Gone are the days, when the foreign bank can safely turn down the Chinese bank order for deposit. A new order of things is being evolved, one which compels respect and co-operation."

It is only natural that in Shanghai will be found the most important of these Chinese banks, and the following list of members of the local banking association will give some idea of the numbers and resources of these institutions:—

Bank of China, The Chekiang Industrial Bank, Chung Foo Union Bank, Chung Hua Commercial and Saving Bank, Sin Hua Savings Bank, The Bank of East Asia, Bank of Communications, The Shanghai Commercial and Savings Bank, Young Brothers' Banking Corporation, The Bank of Canton, Tung Lai Bank, The National Commercial Bank, Salt Industrial Bank, Ningpo Commercial Bank, King Cheng Banking Corporation and the Continental Bank. These banks have all entered the Association as members under strict conditions of qualification.

British North Borneo Railway

THE revenue earned by the railway in 1919 was £26,931, or £3,183 higher than in the previous year. The expenditure amounted to £35,711, or £3,502 more than in 1918. The deficit therefore shows a small increase of about £300. The bulk of the increase in working expenditure is accounted for by war bonuses to the staff and by the continuous rise in the cost of materials. From the figures supplied it was evident that no great hope for any reduction in railway expenditure, but on the contrary it is expected to mount still higher. Retrenchment has in recent years been practised to the utmost extent, and the time has arrived when certain arrears, such as renewal of sleepers and the overhauling of bridges, can no longer be postponed. Capital expenditure on the railway in 1919 amounted in round figures to £5,300, as compared with £1,400 in the previous year. The capital value of the railway appears in the balance sheet as £779,616, or £6,237 per mile, which is still a moderate figure for a tropical railway of similar dimensions.

A beginning has been made on some of the schemes of development which the president outlined on a former occasion. Unfortunately, it has been found impossible to engage contractors from Singapore, owing to their being fully occupied with constructional work in their own colony. It has therefore been necessary to form a separate department, which will be under the direction of Captain Watson, and a large outlay in plant and machinery, steam-rollers, etc., will be entailed. But, in spite of these obstacles, the development program will be vigorously pursued, except, where as in the case of lighthouses, prices are so prohibitive as to compel postponement for a time. Road construction is being kept well to the fore, the main trunk road and the Jesselton-Tuaran road receiving first consideration. The provision of an improved water supply for Sandakan also occupies a prominent place in the program. A site for the new reservoir has been decided upon, and it is proposed to obtain water by means of artesian wells.

The Steam Turbine in China

By H. J. Smith, M.I. Mech. E.

Introduction

TO the engineer of Shanghai Municipal Council, perhaps more than to any other individual, belongs the credit of introducing turbo-generating machinery into China. The installation of steam turbines as prime movers for the generation of electric light and power initiated by Mr. T. H. U. Aldridge at the Riverside plant, is certain to have a marked effect in moulding the policy of power users in this country.

The noble proportions of the larger reciprocating units are already regarded as relics of the past; the modern tendency being to use the kinetic energy of steam for turning small rotors at high velocities instead of using its dynamic force to move a ponderous mass, turbines of 50,000 H.P. are now at work. Imagine a horizontal steam engine of this size and the building required to house it!

It may be interesting, before considering in detail some of the turbo-electric machinery now at work in China, if we trace the history of the steam turbine from the experimental stage to its present development. The first turbine of any utility was put on the market in 1883 by a Swedish engineer named De Laval. It followed closely, and was no doubt based upon, some experiments carried out in Italy by Giovanni de Branca in the 17th Century. But this engine had the insurmountable defect of being suitable for a small output only. Something larger was necessary and it came through the conception of a British engineer (C. A. Parsons), who in 1884 produced the multi-stage *reaction* type of turbine which bears his name. The next inventor was Rateau, a Frenchman, who made a multi-stage *impulse* type of turbine and from these two types the present-day machines have grown.

The principle of the steam turbine may be explained simply as follows: Imagine steam, under a pressure of 150-lbs. per sq. inch, released to atmosphere through a pipe; like water squirting from the fireman's hose. The sudden expansion of this steam would be equal to a velocity of 2,800-ft. per second. If we cause this steam to impinge on the blades of a turbine wheel we shall convert its kinetic energy into rotary motion by using the leverage of the wheel to rotate the shaft to which it is fixed. All turbines are based primarily on this idea; but such a method would be wasteful in the extreme. Instead of the steam being released at once from boiler to atmospheric pressure it is lowered in stages from the initial pressure into a partial vacuum, and the newly acquired kinetic energy caused by each stage of the expansion is arranged to impinge on the blades of a separate wheel in each stage, the power so gained being the sum total of all the energy expended by the steam on, say, 2,000 blades; each blade serving as the end of a lever acting on a single fulcrum, namely, the axis of the turbine shaft.

Types

There are at present four different methods for obtaining this result. They are—

- (1) The Rateau type built up of pure Rateau (impulse) stages only.
- (2) The Parsons type built up of pure Parsons (reaction) stages only.
- (3) The Curtis-Rateau turbine having one velocity wheel and a number of Rateau stages.
- (4) The Curtis-Parsons turbine having one velocity wheel and a number of Parsons stages.

In the Parsons turbine (Fig. 1) the steam does not expand from high pressure to exhaust pressure in one set of nozzles, but the total available pressure drop is divided into small partial pres-

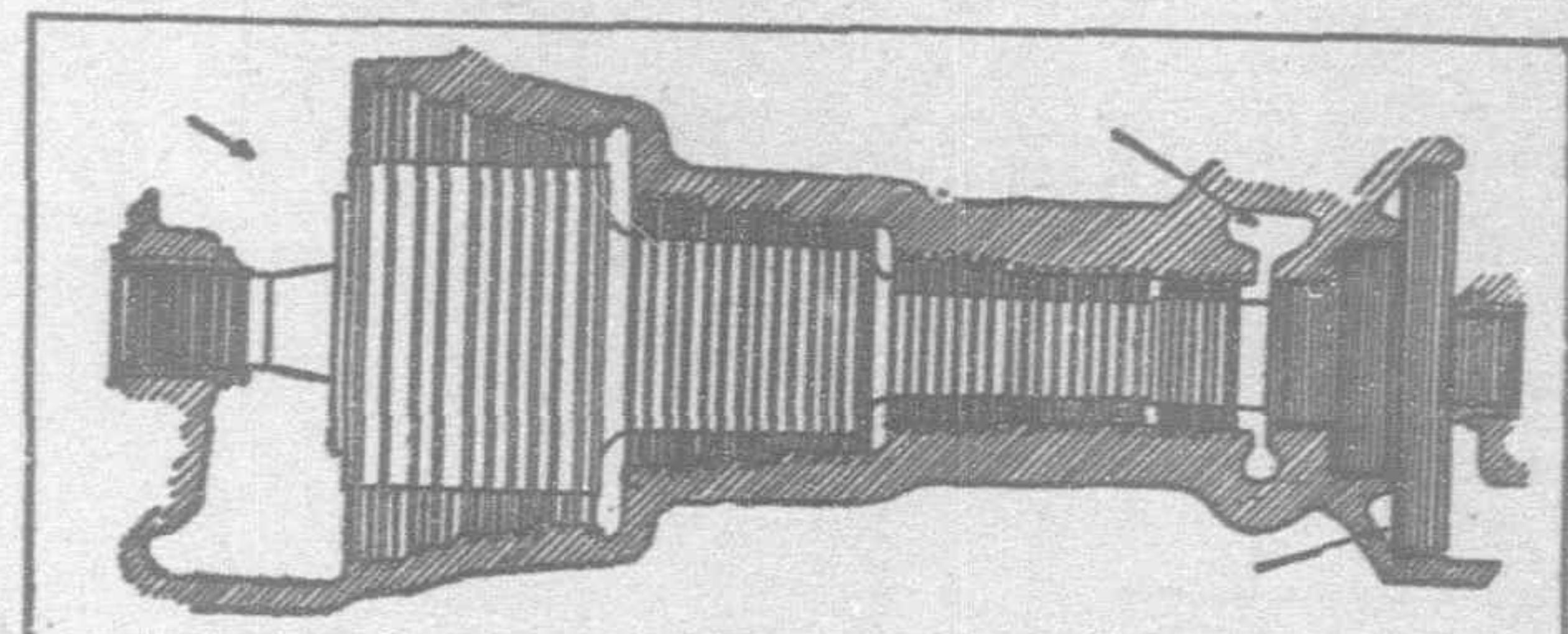


Fig. 1.—Section through a Reaction Turbine

sure drops. The steam admitted to the turbine expands in the first guide blades to a certain extent, the kinetic energy thus developed being utilized in the following row of moving blades; at the same time the expansion continues in the moving blades, so that another pressure drop takes place in the moving blades. After the moving blades there is another set of guide blades in which further expansion takes place, followed by another set of moving blades with further expansion. One set of guide blades and one set with corresponding moving blades forms one stage.

In the Rateau turbine (Fig. 2) the available pressure drop is also subdivided into small pressure drops. The steam is admitted to a set of nozzles in which it partially expands, and the kinetic energy gained by the expansion is utilized by a moving wheel provided with blades on which the steam from the nozzles impinges. After passing through the wheel the steam enters another set of nozzles or guide blades in which a further pressure drop takes place, and the kinetic energy is utilized in the following wheel, this being repeated several times until the exhaust pressure is reached. One set of nozzles or guide blades with one rotating wheel forms a stage, and a number of such stages a Rateau turbine.

The Rateau turbine permits of much fewer stages to obtain the same efficiency as the Parsons turbine, and consequently the Rateau turbine is considerably shorter and has an enhanced rigidity and safety.

The Curtis turbine (Fig. 3) is an impulse turbine consisting of two or more stages. Each stage consists of a set of nozzles where the steam expands and of a wheel carrying two or more rows of moving blades. The steam issuing from the nozzles strikes the first row of moving blades and transmits a large portion of its kinetic energy to the rotating disc. It then passes through guide blades fixed to the turbine casing and is projected on to the second row of moving blades of the velocity wheel. This is repeated if there are more rows of blades on the wheel.

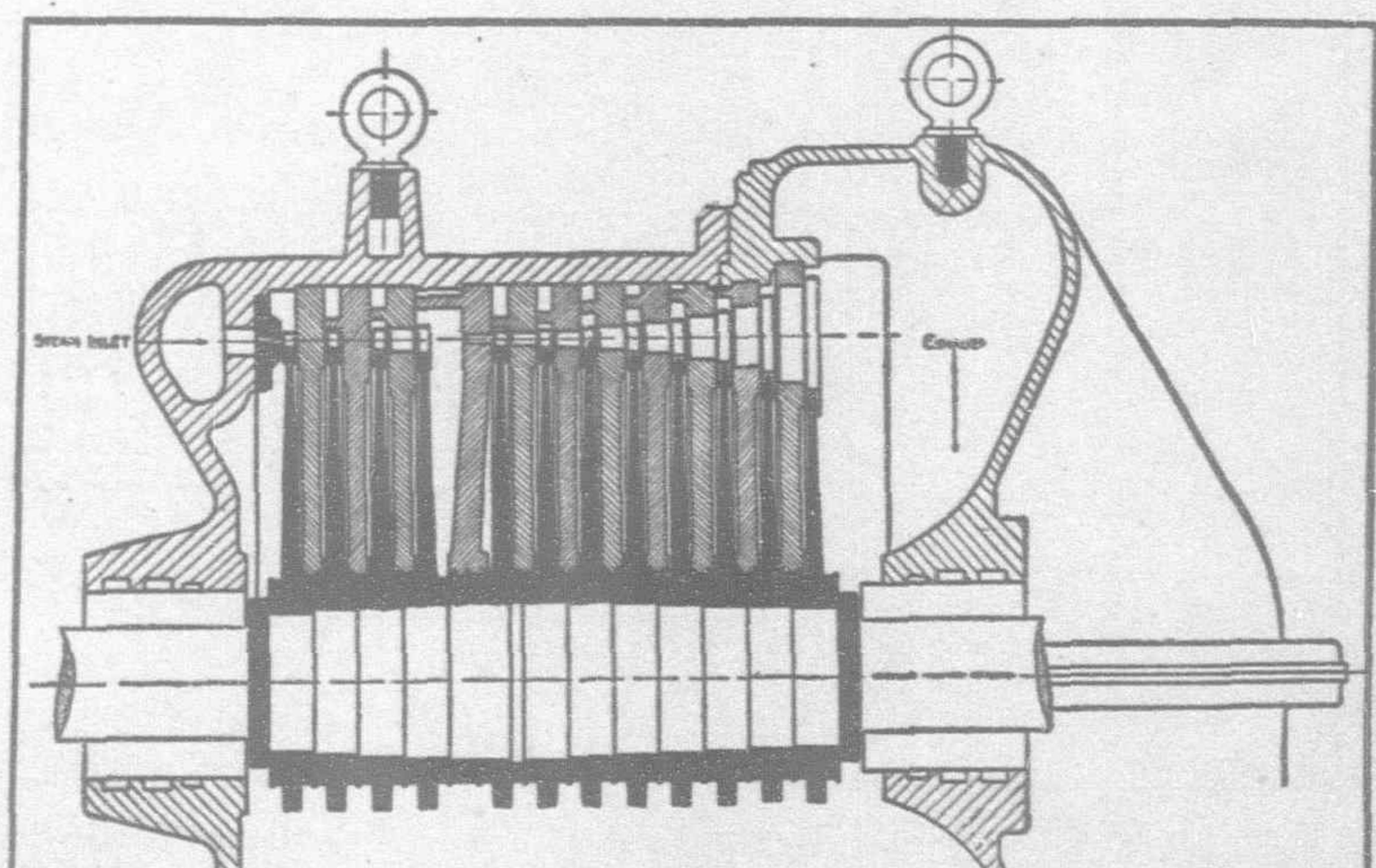


Fig. 2.—Section through Impulse Type Turbine

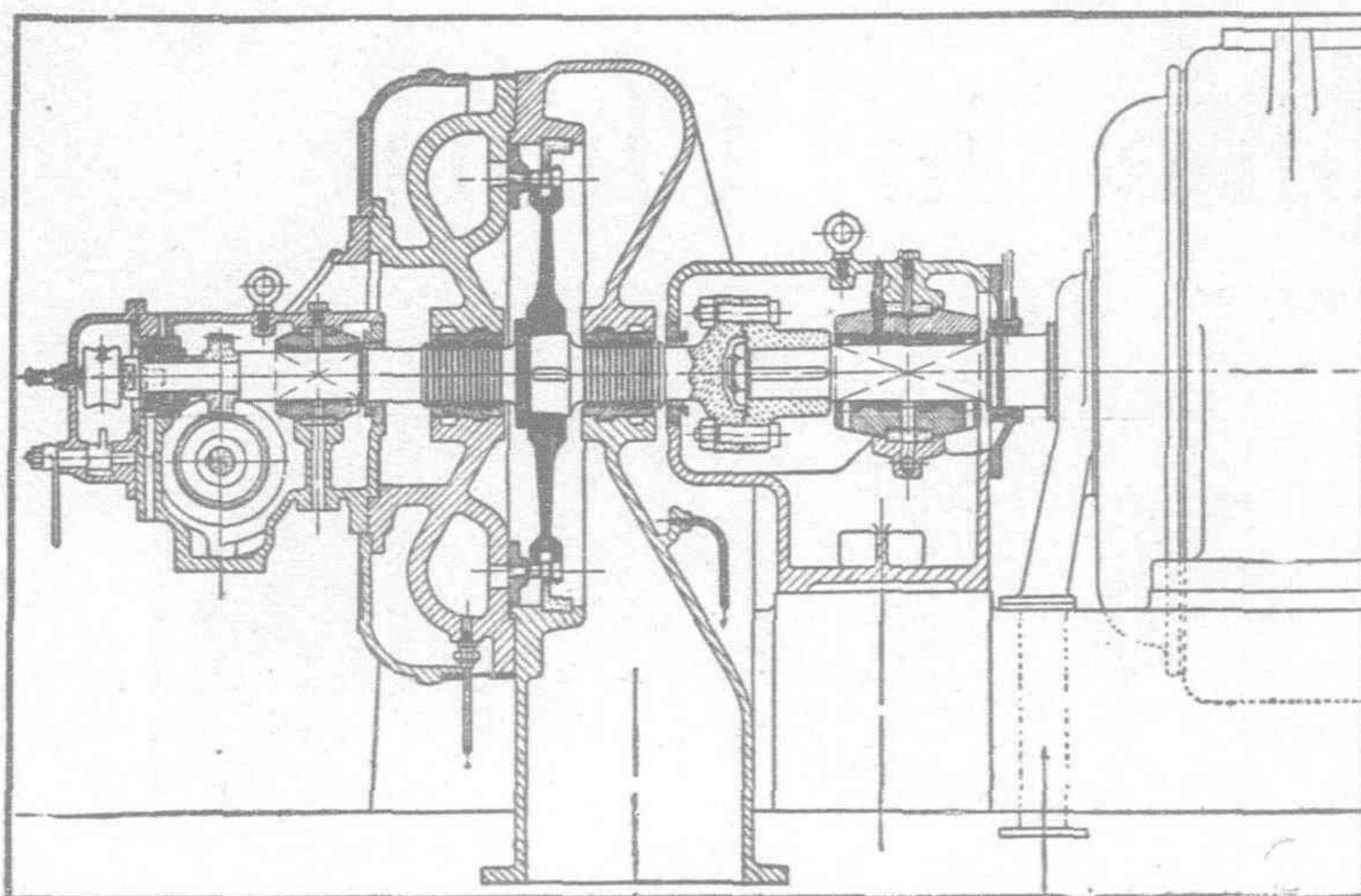


Fig. 3.—Fraser & Chalmers Curtis Turbine

The modern tendency is to combine one velocity wheel in the high-pressure part of the turbine with a number of Rateau stages (Fig. 4) or Parsons stages in the low-pressure part. Although, speaking generally, the velocity wheel is less efficient, it can be designed in many instances so as to have the same efficiency as the Rateau or Parsons stages in the high-pressure part of the turbine.

Development

We will next trace the development of the steam turbine as an economical and reliable prime mover along two lines, namely, size and efficiency. Regarding size, the first Parsons turbine developed 10 H.P. when running at 18,000 revs. per minute. In 1898 a plant was built for an output of 1,000 K.W. the speed being 1,500 revolutions per minute.

About 1906 the speed remained the same but the size had grown to 5,000 K.W. By 1912 the size had reached 12,000 K.W. and one of the leading British manufacturers produced the

first 5,000 K.W. unit to run at 3,000 revolutions per minute. The same firm then built an 8,000 K.W. turbine to run at this speed and afterwards a 12,000 K.W. unit. They also constructed for the Glasgow Corporation a 25,000 K.W. set to run at 1,500 R.P.M. This last size is not the limit, as there are no mechanical limitations to prevent the building of a 50,000 K.W. set. Only the cost per kilowatt will be the deciding factor as regards size. In the matter of efficiency the results are equally remarkable. The first Parsons turbine, when using steam at 60-lbs. pressure and exhausting against atmosphere used a steam consumption equal to 200-lbs. per kilo watt hour, or a turbine efficiency of only 15 per cent. By the time turbines had reached the 1,000 kilo watt size the steam consumption had been lowered to 20.1-lbs. per kilo watt hour, this being equal to a turbine efficiency of 54 per cent.. In 1910 British machines of the same size had reached an efficiency of 66 per cent. and this had been improved by 1915 to 73 per cent. To-day we can get 75, 76 and 79 per cent. according to the size of unit and a 5,000 K.W. turbine will now produce one B.H.P. per hour for one pound of good coal. These figures can still be improved upon to some extent, although anything like 100 per cent. is not obtainable. The friction caused by the flow of steam through the

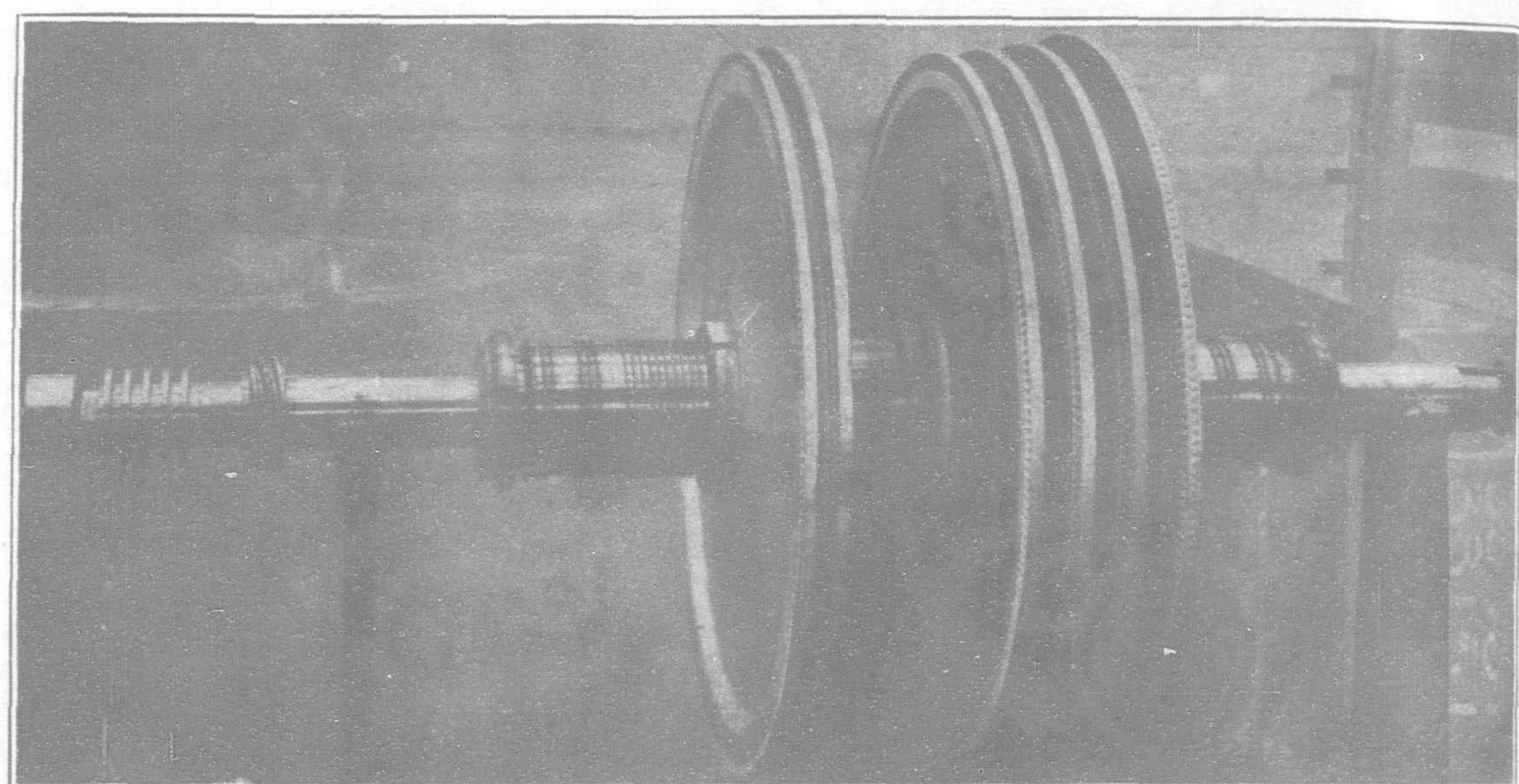


Fig. 4.—Velocity Wheel in Fraser & Chalmers Turbines

valves is a certain loss. The shock of steam impinging on each turbine blade means loss through setting up eddying currents which interfere with the flow of steam. Then there is the skin

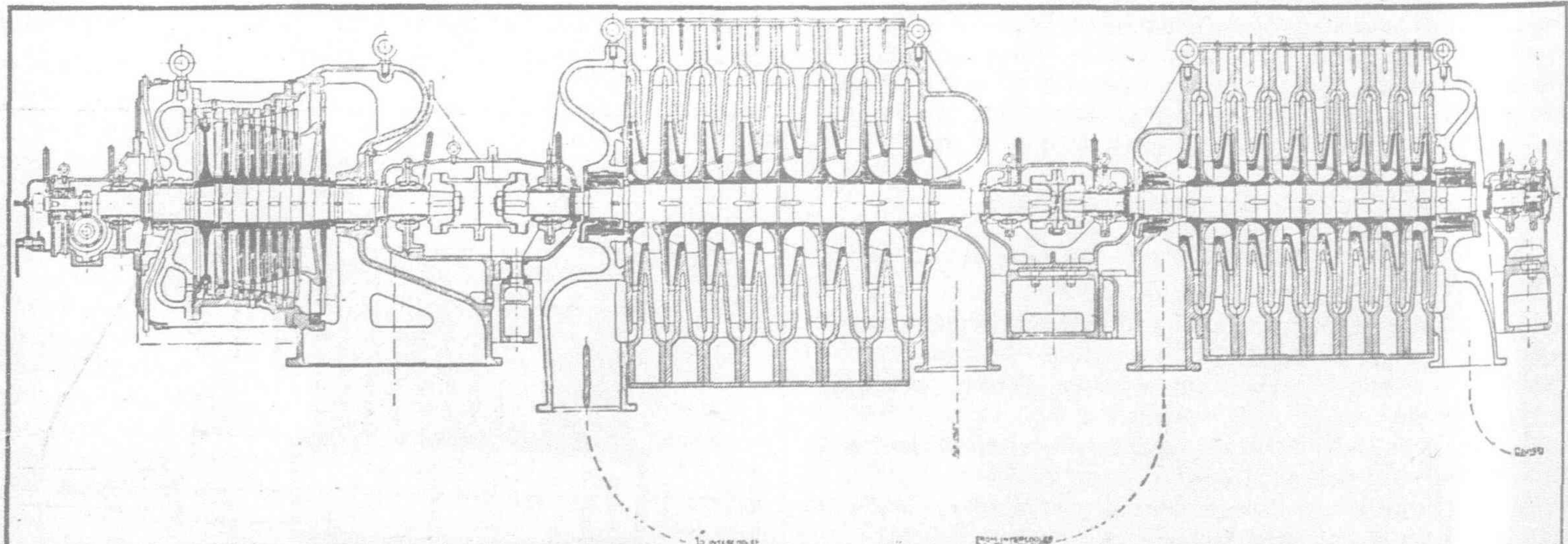


Fig. 5.—Sectional Arrangement of Fraser & Chalmers Turbo-Compressor. Output 20,000-25,000 cubic feet air per minute against a pressure of 100-110 lbs. per square inch.

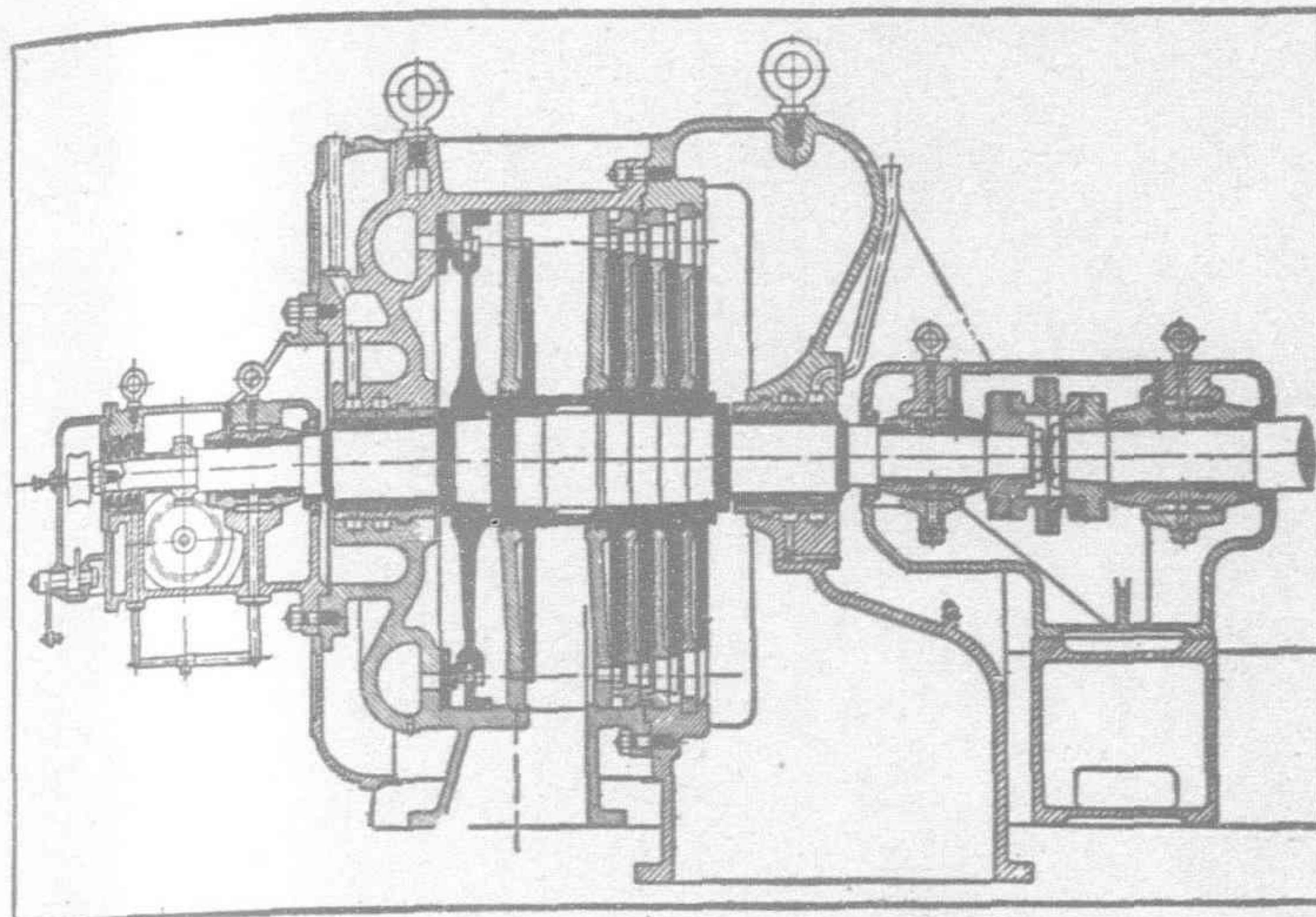


Fig. 7.—Section of a Mixed Pressure Turbine

friction of the turbine discs revolving at high velocities.

All the above added to leaks through glands and bearing friction amount to a total of about 25 per cent., sometime more sometimes less, so that the average efficiency of a turbine may be considered about 75 per cent.

Where, then, it may be asked, will the improvement come from? We will take an actual instance where a certain turbine is working with dry saturated steam at 100-lbs. pressure and exhausting to a partial vacuum of $27\frac{1}{2}$ inches. The steam consumption is 16.4-lbs. per K.W. hour. Now imagine this turbine fed with steam at 300-lbs. pressure, superheated another 250°F ., and the pumps altered to pass sufficient cold water through the condenser to maintain a vacuum of 29 inches. The steam consumption under these new conditions would now be only 10.2-lbs. or a saving in the coal bill of nearly 38 per cent. and the turbine has not been altered.

Such thoughts may lead to the conclusion that we are in the hands of the boiler-maker, but the improvement set forth by the writer is not supposition; it is being done in Great Britain to-day. It may be improved upon shortly because years of experiments a British water-tube boiler has been perfected which burns the commonest coal to almost perfect combustion and raises steam to a pressure of 350-lbs. to the square inch. The steam can then be superheated to a temperature of 750°F ., and neither boiler-makers or turbine designers will be any more nervous than they were when working under the old conditions.

It will be realized that it is not only necessary to consume coal to the best advantage. We must also transport it, unload, store and feed it to the boilers in the most economical manner possible. This matter is outside the scope of the present article but those interested in handling minerals in bulk can read the author's remarks on the subject in another place.*

* *Engineering*, January 28th, February 4th and 11th, 1921, also *The Electrician*, December 31st, 1920.

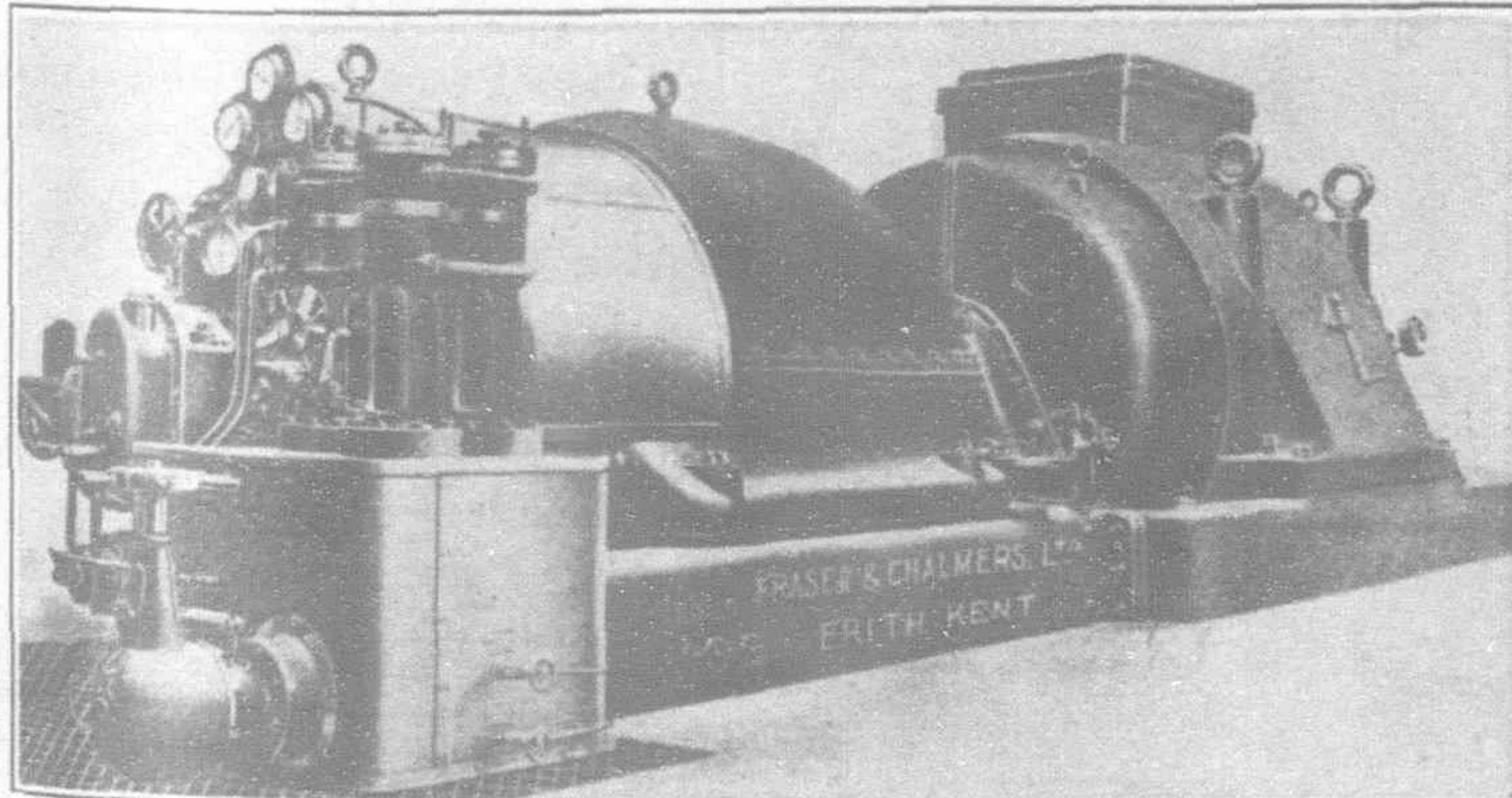


Fig. 8.—Fraser & Chalmers Turbo-Alternating Generator, 3-phase, 50-cycles, supplied to the Shanghai Municipal Electricity Works, by the Agents, The General Electric Company of China, Ltd. Capacity, 5,000 K.W., 6,250 K.V.A., 6,600 volts, 3,000 r.p.m.

Special Types

We will now consider the steam turbine from another point of view, namely, its ability to generate power from waste or low-pressure steam. It is not generally realized that 20,000-lbs. of steam exhausted from a non-condensing engine can be utilized in a low-pressure turbine to nearly equal to 10,000-lbs. of steam at 150-lbs. boiler pressure. Until recently the steam exhausted from large colliery engines used to be allowed to escape to the atmosphere. Such waste is no longer tolerated on a modern plant. The steam is led either to a low or a mixed pressure turbine and coupled to a generator for supplying electric light and power all over the mine.

These low-pressure turbines, although similar in many respects to the high-pressure type, have a smaller number of stages with no velocity wheel. In the case of an intermittent supply as from a rolling mill or winding engine, a heat accumulator can be installed with advantage.

The heat accumulator receives the steam from the winding or other engines; part of that steam is condensed while the main steam engine exhausts into the accumulator, and is again evaporated when the steam engine ceases to supply the steam. The intermittent condensation and evaporation in the accumulator equalizes the steam supply to the steam turbine.

A mixed pressure turbine (Fig. 7) works with steam from two sources. Live steam can be admitted to the first stages and low-

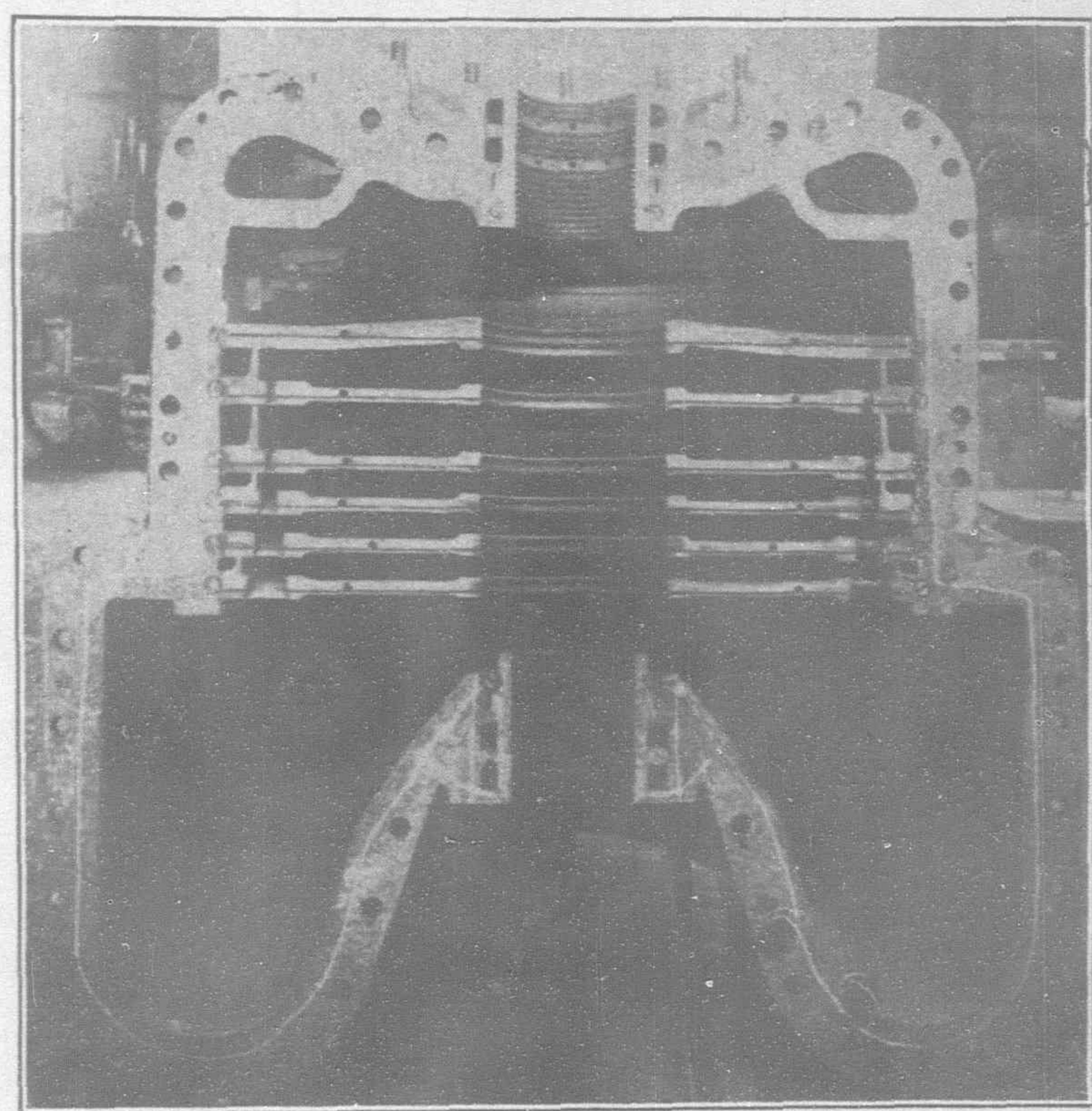


Fig. 9.—Turbine Casing with Top Half Removed

pressure steam to the low stages, the turbine being arranged to work independently on either high or low pressures or a mixture of both. The continuity of operations is ensured automatically by special governing arrangements, the turbine taking low-pressure steam only so long as there is sufficient available; otherwise high-pressure steam is admitted from the main boilers. The economy of using such a machine in conjunction with the large steam units to be found in cotton mills, paper mills, steel works and mines is obvious.

Where steam heating and power are required at the same time, either a back pressure or a pass out bleeder turbine could be installed with advantage. The back pressure turbine is a simple and inexpensive arrangement, one velocity wheel being in most cases quite sufficient to get the result required. In the reducing or bleeder turbine part of the steam is allowed to leave the casing after doing work in the high-pressure portion of the turbine.

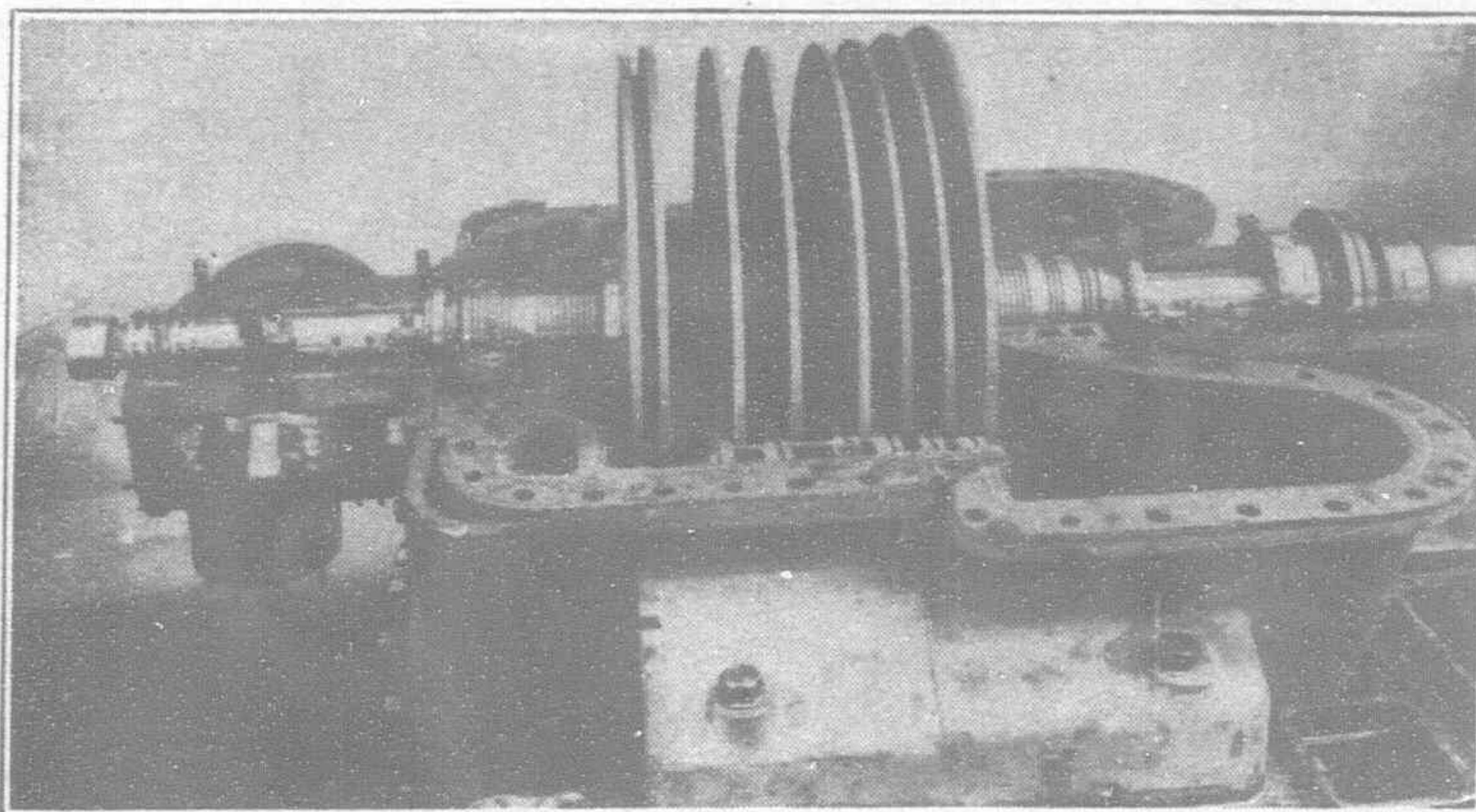


Fig. 10.—Top Half of Turbine Casing Removed Showing Rotors

In this connection it should be noted that steam exhausted from a turbine to the heating system contains no oil or foreign matter as is always the case with reciprocating engines.

Amongst the numerous other examples where the steam turbine can be installed with the best results the exigencies of space will only allow mention of the arrangement adopted for sea-going craft. The marine turbine has little material difference to the types already described, except that some manufacturers divide the turbine into two casings. The high-pressure casing contains one velocity wheel and three single stage wheels for the ahead turbine and one velocity wheel only for the astern turbine. The steam from the high-pressure casings is led by means of pipes to the low-pressure casings. The ahead turbine in the low-pressure casing consists of five single wheels, whilst two are placed in the astern casing. The steam from the low-pressure casings goes, of course, to the condenser. Each rotor drives a double speed reduction gear. The writer hopes to go further into the detail of turbines for special purposes in a future article.

Chinese Plants: Shanghai

Reverting now to that part of our subject which concerns the description of turbines actually installed in China we will take as example the 5,000 K.W. set for the Shanghai Municipal Council and the 1,500 K.W. sets installed for the Han Yeh Ping Iron & Coal Co. at their new Tayeh Works. A description of turbo-blowers (Fig. 15) supplied to the same company must wait for another opportunity.

A Fraser & Chalmers turbine supplied to Shanghai is rated for an output of 5,000 K.W. at 3,000 R.P.M., and an overload of 25 per cent. to be obtained automatically when supplied with steam at 180-lbs. pressure and superheated to 570°F. The alternator is direct coupled to the turbine by a claw type flexible coupling and is designed for an output of 6,250 K.V.A. when running at 6,600 volts, and 80 per cent. P.F. The periodicity is 50 cycles per second. This alternator is totally enclosed, the ventilation and cooling being arranged by drawing cold clean air through an Heenan wet filter and forcing it through the core and windings of the stator and rotor by means of fans fixed to the rotor shaft. Automatic gear takes care of the pressure regulation and resistance is provided for the alternator and exciter fields, the former being operated either by hand or a small direct current motor.

The condenser is of the surface type with a cooling area of 12,000 square feet. It is designed to maintain a vacuum of 28½ inches when dealing with 65,000 pounds of steam per hour if supplied with not less than 8,670 gallons of water at a temperature not exceeding 80°F.

It will be seen by the illustration that the Fraser & Chalmers turbine (Fig. 8) is provided with an horizontal joint so that the top half of the casing can be lifted bodily with the top half of the diaphragms (Fig. 9) and so expose the rotor for complete inspection (Fig. 10). The connection between the lower casing and the condenser is so arranged that all movements due to contraction

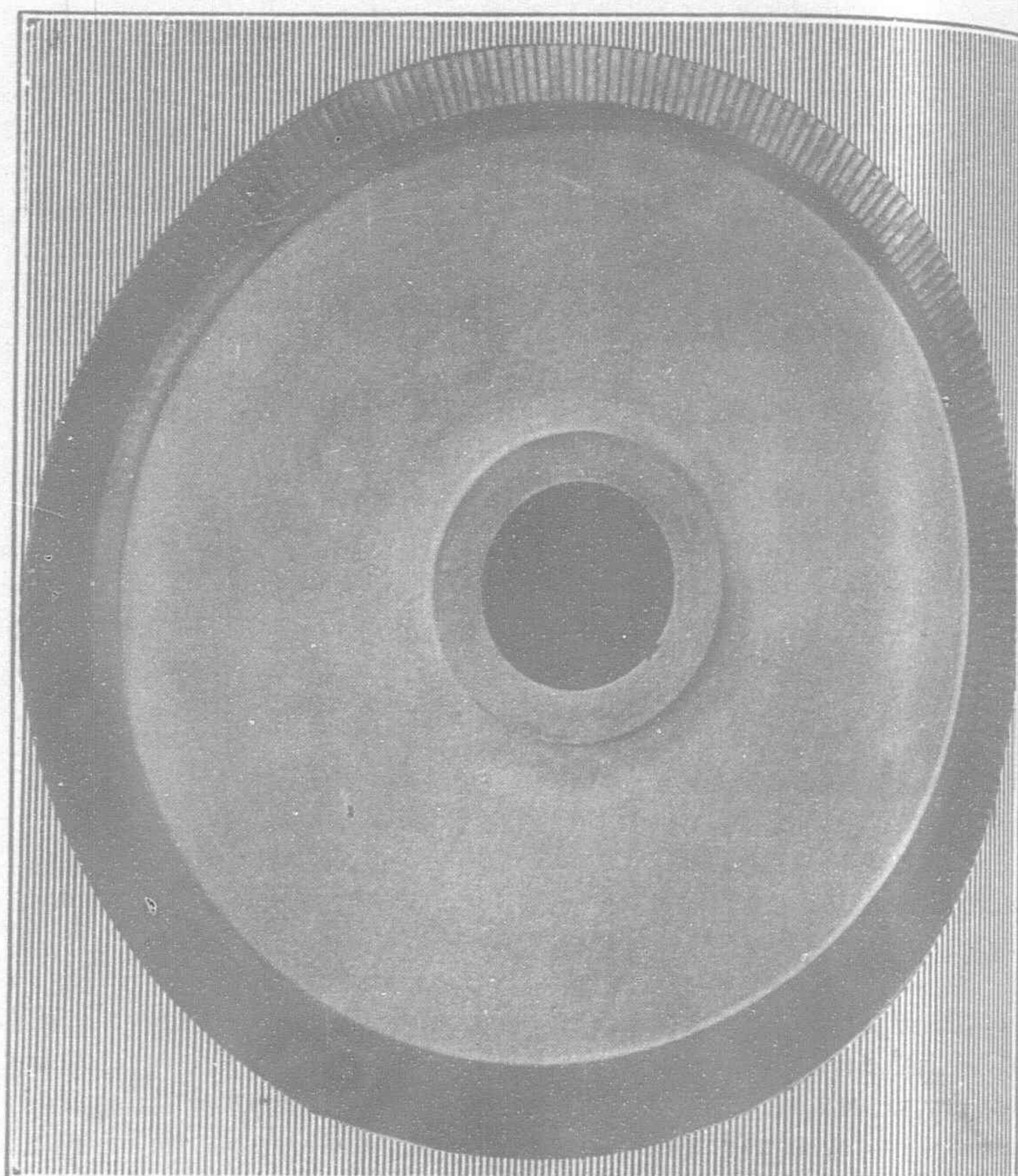


Fig. 11.—Turbine Wheel

and expansion can take place freely without setting up any strain in either.

The steam from the boilers is led through a separator and then enters the steam chest which contains a stop and emergency valve combination leading to a number of throttle valves each of which governs a certain number of nozzles corresponding to the load on the turbine. The total cubic capacity of the outlet as compared to the opening of the valves allows a certain expansion of the steam in the first stage, the kinetic energy thus obtained being used in a velocity wheel. The following stages each consist of a moving wheel with a single row of blades (Fig. 11) separated one from the other by diaphragms (Fig. 12), which contain the nozzles and increase in size stage by stage until the kinetic energy of the steam is exhausted. All the blades are of nickel steel and the rotating discs of Siemens Martin steel. The actual construction of these blades and diaphragms will be explained in the next article.

The turbine is fitted with a forced lubrication system, the power being supplied by a valveless type of rotary pump driven direct from the main shaft through worm gearing. The oil is cooled by passing through a cooler of the surface condenser type. As an extra precaution the main bearings are provided with water jackets, but in practice these were not found necessary, the oil cooler keeping the lubrication correct even in the hottest weather.

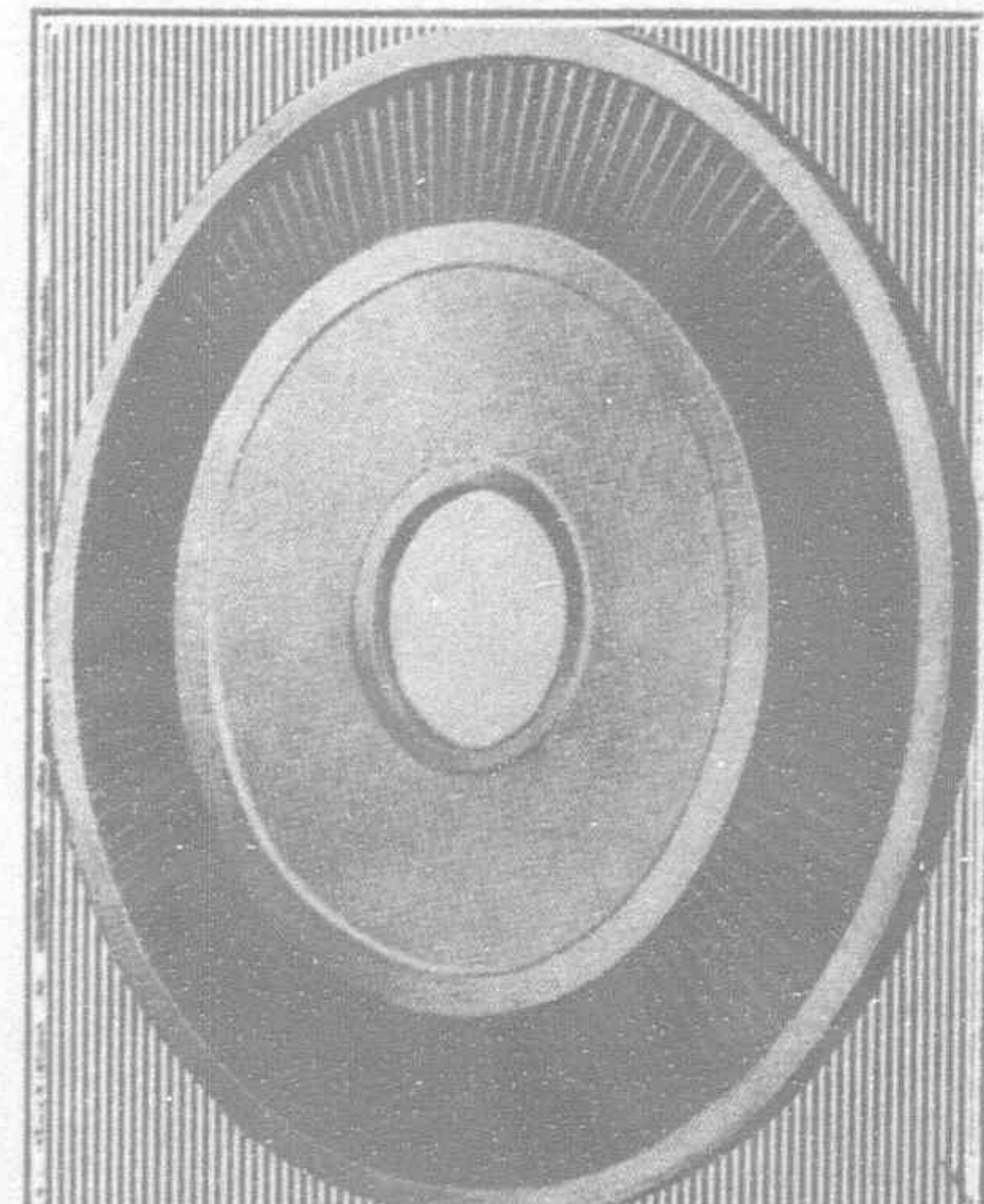


Fig. 12.—Diaphragm

The speed of the set is controlled by a governor of the centrifugal spring type arranged horizontally under the main turbine shaft and driven from same by worm gearing. The governor is provided with hand operating speeder gear and also with electric speed control worked from the switchboard, allowing a variation of plus or

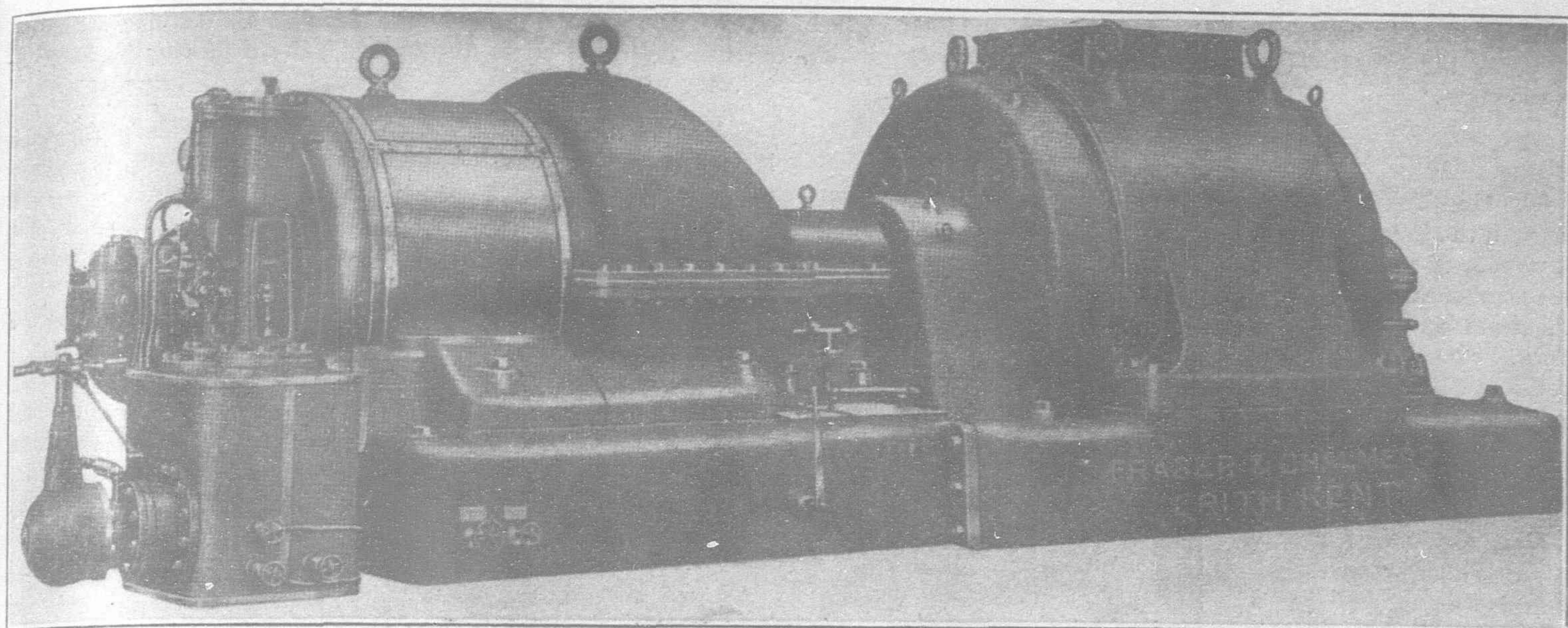


Fig. 13.—Type of Fraser & Chalmers Turbo-Alternators, supplied to the Han Yeh Ping Iron & Coal Company. Capacity, 1,500 K.W., 1,875 K.V.A., 3,000 r.p.m.

mines 5 per cent. on the governor setting. The plant has now been in operation over two years giving satisfaction to all concerned.

The steam consumption of 13-lbs. per k.w. hour was guaranteed within a margin of 5 per cent. tolerance and the official test proved the actual figures to be within the prescribed limits.

In addition to the above 5,000 kilowatt turbo-generating set supplied to the Shanghai Municipal Electric Plant by Fraser

& Chalmers through their agents, the General Electric Company of China, Ltd, a 10,000 kilowatt turbo-alternating set was installed at the same works in April 1920, by the British Electrical and Engineering Company of China. This machine was built by Messrs C. A. Parsons of Newcastle-on-Tyne, and guaranteed to generate with a steam consumption of less than 12-lb. per kilowatt hour better than any other machine of the same size and $2\frac{1}{2}$ pounds better than the average consumption of the station. In addition

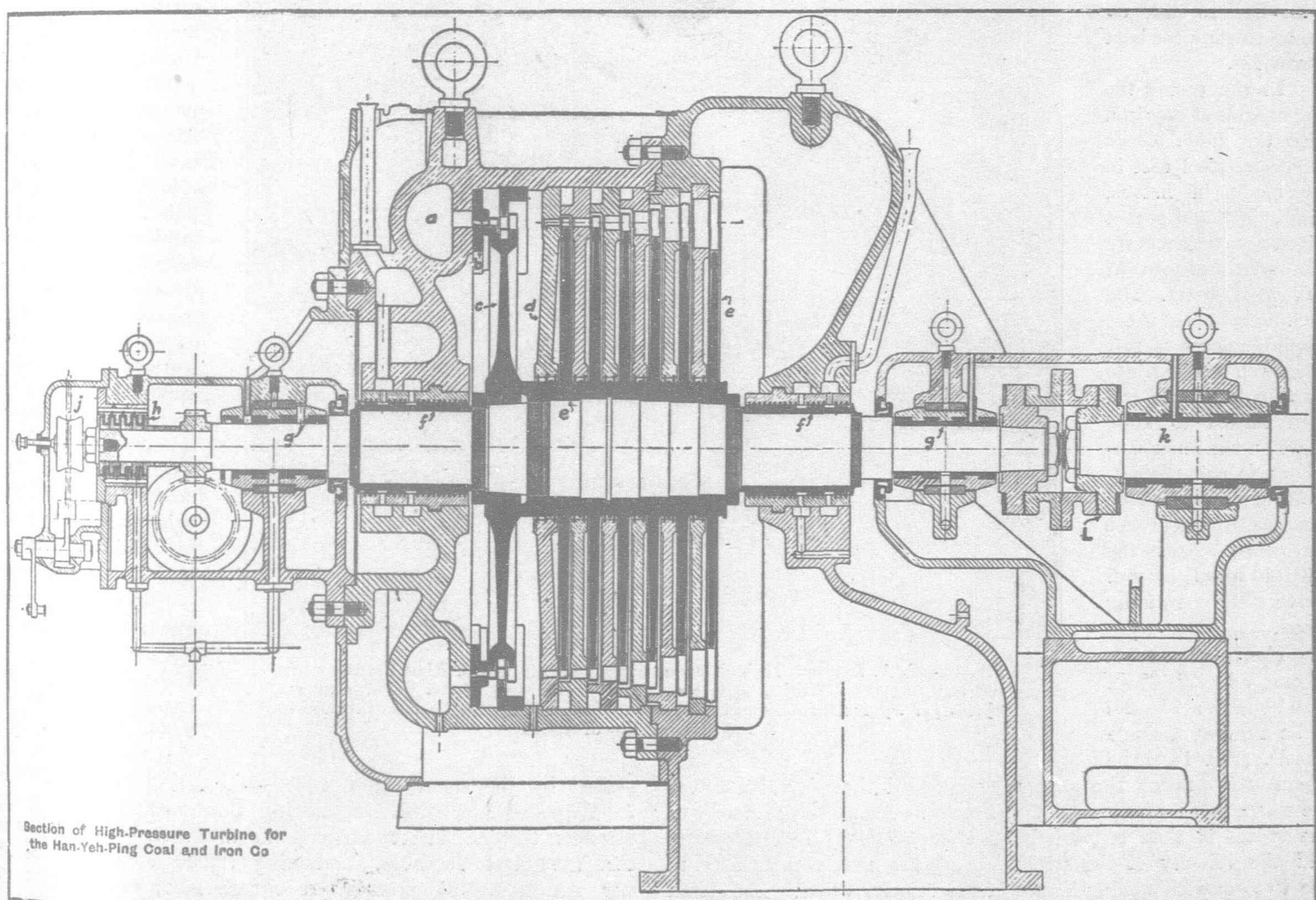


Fig. 14.—Section of High Pressure Turbine for the Han Yeh Ping Coal & Iron Company

to this set there is another 800 kilowatt Parsons turbine installed in 1907 at the Fearon Road station of the Shanghai Municipal Electric plant.

Han Yeh Ping

The Han Yeh Ping Iron & Coal Co., concluded in 1915 a contract with the Fraser & Chalmers Engineering Works for the supply of two sets of turbo-alternators with condensing plant. (Fig. 13). The output of each unit is 1,500 K.W. at 3,000 R.P.M. when supplied with steam at a pressure of 150-lbs. square inch, and superheated 100°F. The surface condensers have a cooling area of 3,600 square feet and are capable of condensing 17,000-lbs. of steam per hour and maintaining a vacuum of 27½ inches when supplied with sufficient cooling water at a temperature not exceeding 85°F.

The circulating, hotwell and air extraction pumps are all driven by Terry turbines running at 1,500 r.p.m. These auxiliaries exhaust into the main turbine casing so that the somewhat large steam consumption of these small turbines is made a matter of no importance. The turbine casing is cast in four sections and bolted together permanently round the circumferential joint so as to divide the casing into top and bottom halves. The exhaust end is fixed to the bedplate the high-pressure end being free to slide on guides to allow for heat expansion.

In the casing the diaphragms of cast iron with the guide blades of special steel cast in are made in halves, with spigot and socket joint to ensure accurate alignment and prevent leakage of steam. The packing glands of these diaphragms are of soft brass well caulked into machined recesses and then turned to knife edges on the inner periphery to suit the diameter of the rotor shaft. Practically no clearance is required because the critical speed is well above the running speed.

The rotor consists of one velocity wheel with two rows of blades and a number of single wheels. (Fig. 14.) The steam after passing the governor controlled throttle valve enters the steam belt leading to the first nozzles. The potential energy of the steam is then converted by expansion into kinetic energy and the velocity of the steam leaving the nozzles is utilized in the two rows of moving blades of the velocity wheel. The steam impinging on the first row of moving blade transmits a large portion of its kinetic energy to the rotating disc. It then

passes through the guide blades fixed to the turbine casing and is then projected on to the second row of moving blades of the velocity wheel.

The steam then passes through the first diaphragm in which it expands further, the kinetic energy gained by the expansion being utilized in the next moving wheel, this process being repeated through all the following stages. Packing glands of the labyrinth type holds the steam at the high pressure end and prevents loss of vacuum at the opposite end of the casing.

The alternators have a rating of 1,875 K.V.A. or 1,500 K.W. They are ventilated by means of fans mounted on the rotor, the cleanliness of the cooling medium being ensured by a system of dry air filters.

The switch gear layout provides for three generator panels, one exciter panel, five feeders and two transformer panels. All the high-pressure apparatus is suitably mounted in concrete cubicles well clear

of the operating board. The oil immersed single pole main switches are in separate tanks and interconnected externally by spindle and bell cranks which can be operated by hand from the panel board.

It is interesting to note that the ore crushing and cleaning plant at the mines, nearly nineteen miles away from the power generating plant, together with the air compressors and other machinery totalling altogether about 1,000 K.W. receive their power transmitted at 22,000 volts by an overhead line. This line is in three sections with pole isolating switches mechanically operated from the ground. Electrolytic lightening arresters are provided at each end for the protection of connected apparatus. Taken altogether the installation provides an object lesson on the way modern methods are being adopted by purely Chinese undertakings.

In addition to the above Fraser & Chalmers installation at the Hanyang Steel Works, there is a Westinghouse 2,000 kilowatt steam turbine generator in

stalled by the agents of that company, the Gaston, Williams & Wigmore Electrical Engineering Corporation, and a C. A. Parsons turbine direct coupled to a C. A. Parsons blower for the blast furnaces, delivering 78,000 cubic feet of air per minute at 8½ pounds per square inch, running at 7,800 r.p.m.

(To be concluded).

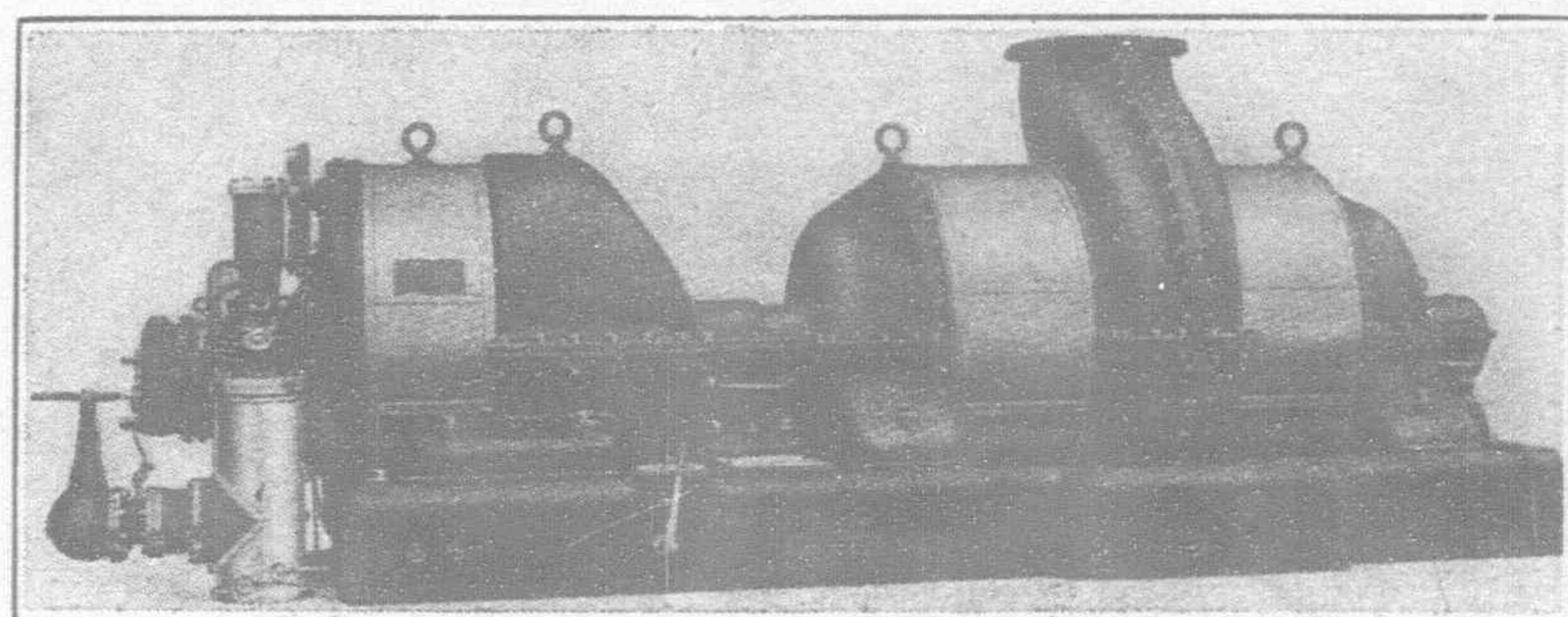


Fig. 15.—Type of Fraser & Chalmers Turbo-Blowers installed for the Blast Furnaces of the Hanyang Iron & Steel Works

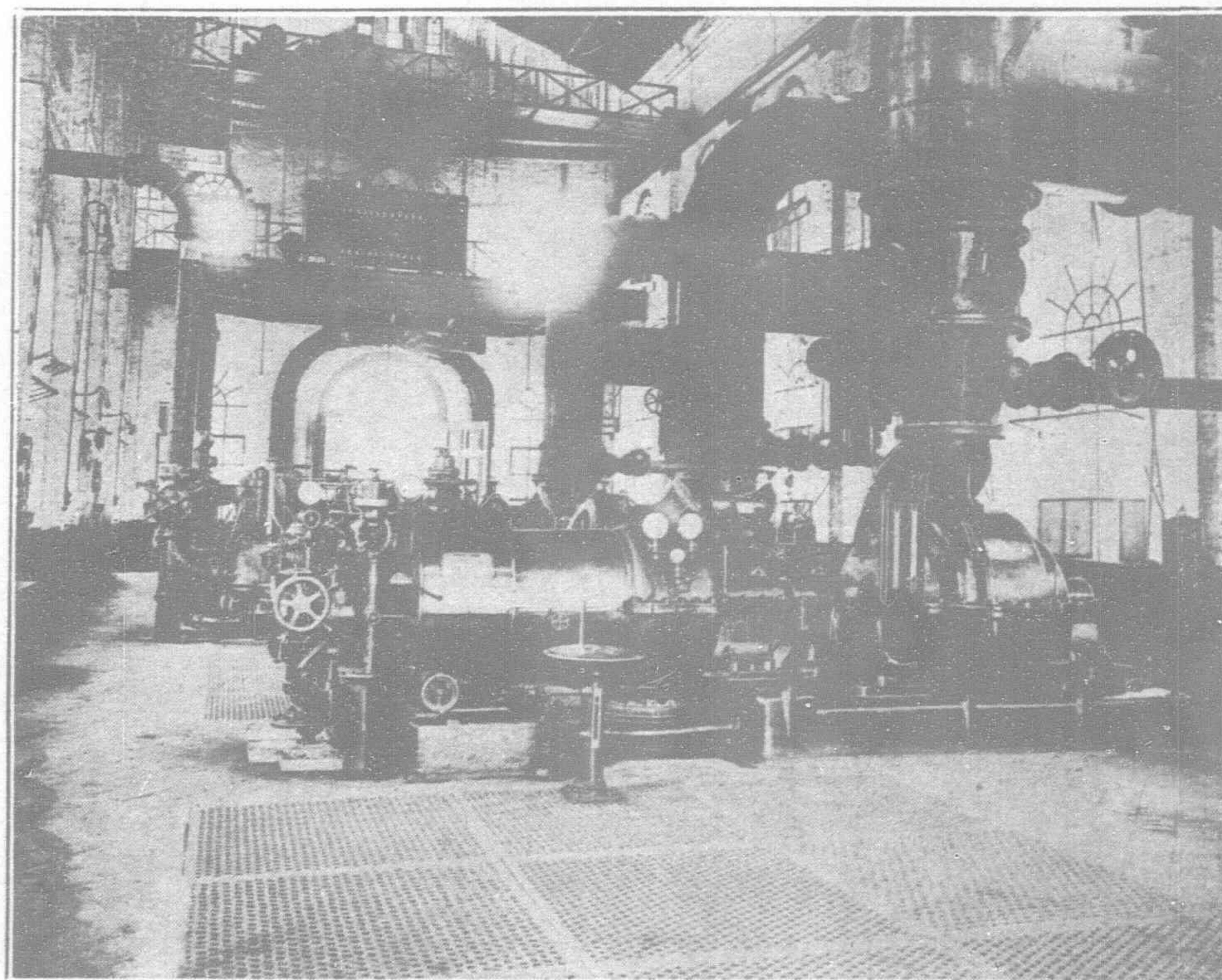


Fig. 16.—C. A. Parsons Turbo-Blowers supplying Air to the Blast Furnaces of the Hanyang Steel Works, delivering 78,000 cubic feet of Air per minute at 8½-lbs. per sq. inch, running at 7,800 r.p.m. Installed by the British Electrical & Engineering Co. of China

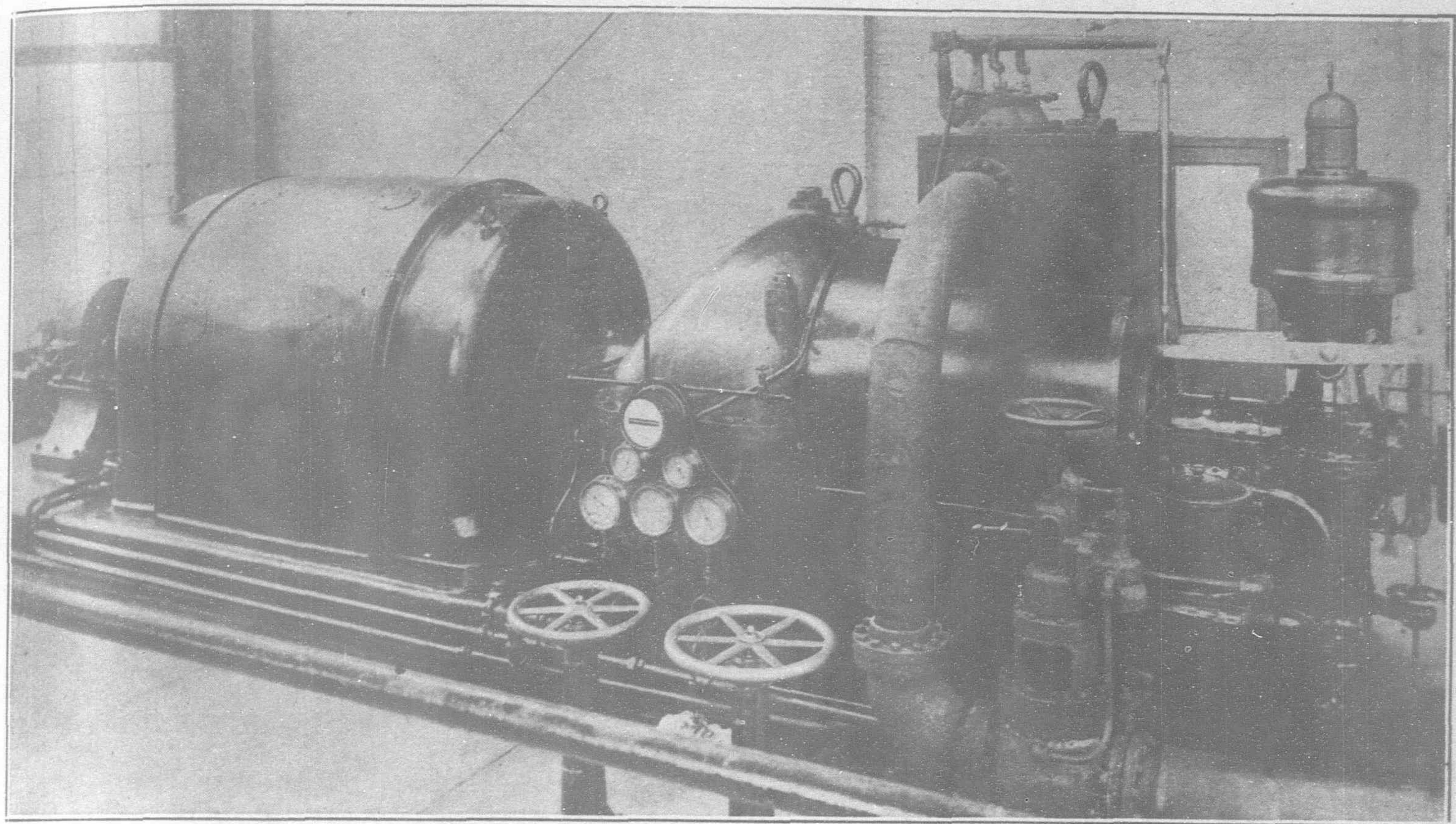


Fig. 17.—A Westinghouse 2,000 Kilowatt Turbo-Generator Unit installed at the Han Yeh Ping Steel Works, by the Gaston, Williams & Wigmore Electrical Engineering Corporation

In these, as in the preceding photographs which illustrate Mr. Smith's article, it will be seen that rapid strides are being made in China in an electrical way, and if in an electrical way then in other ways for power were needless if industrial development were absent. A number of large electrical instruments are installed at the Han-yeh-ping Steel Works besides those shown, and it is not necessary to make mention of the unflagging activities of this concern except to say that it has established a high water mark in China engineering which demands an equal

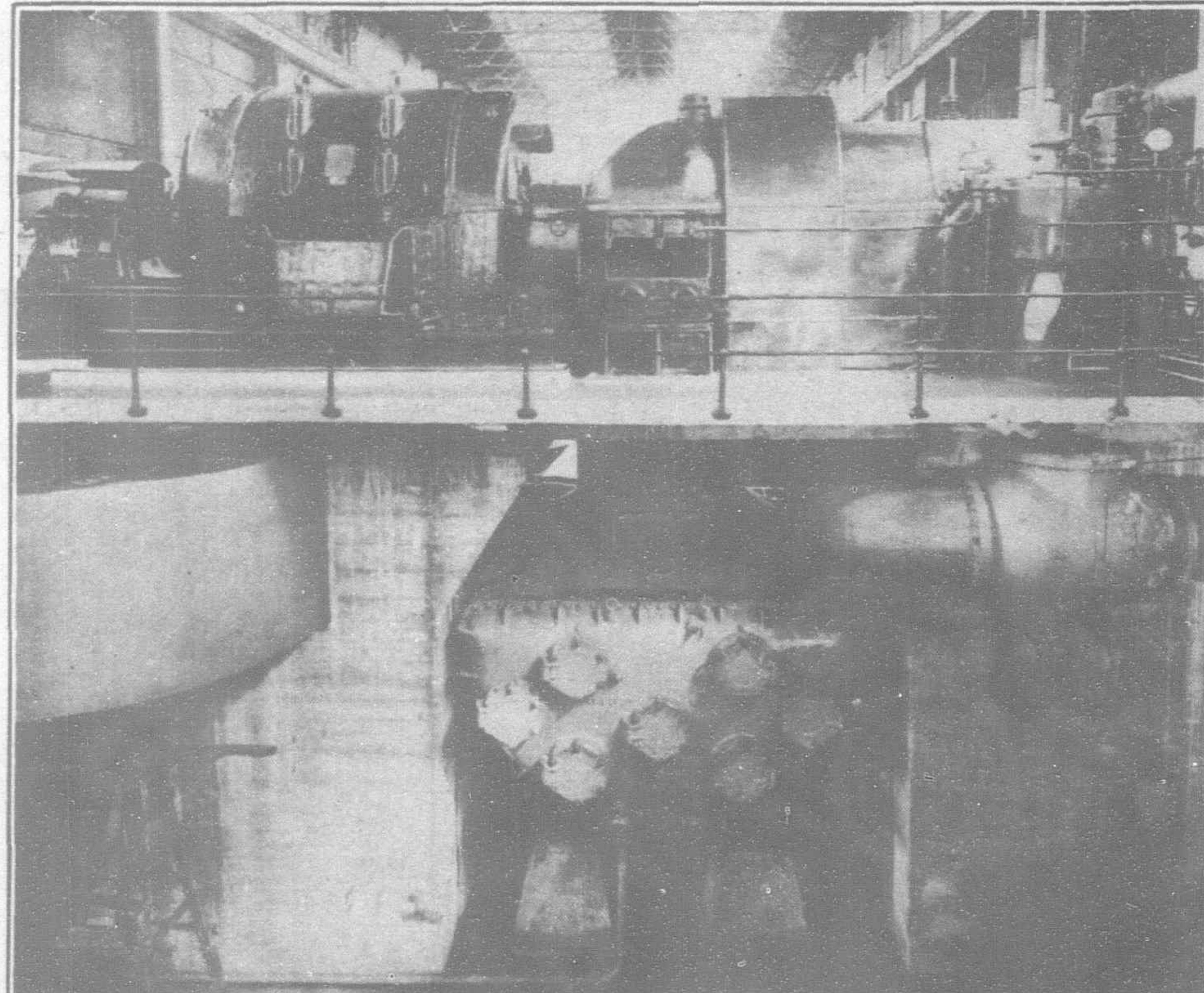
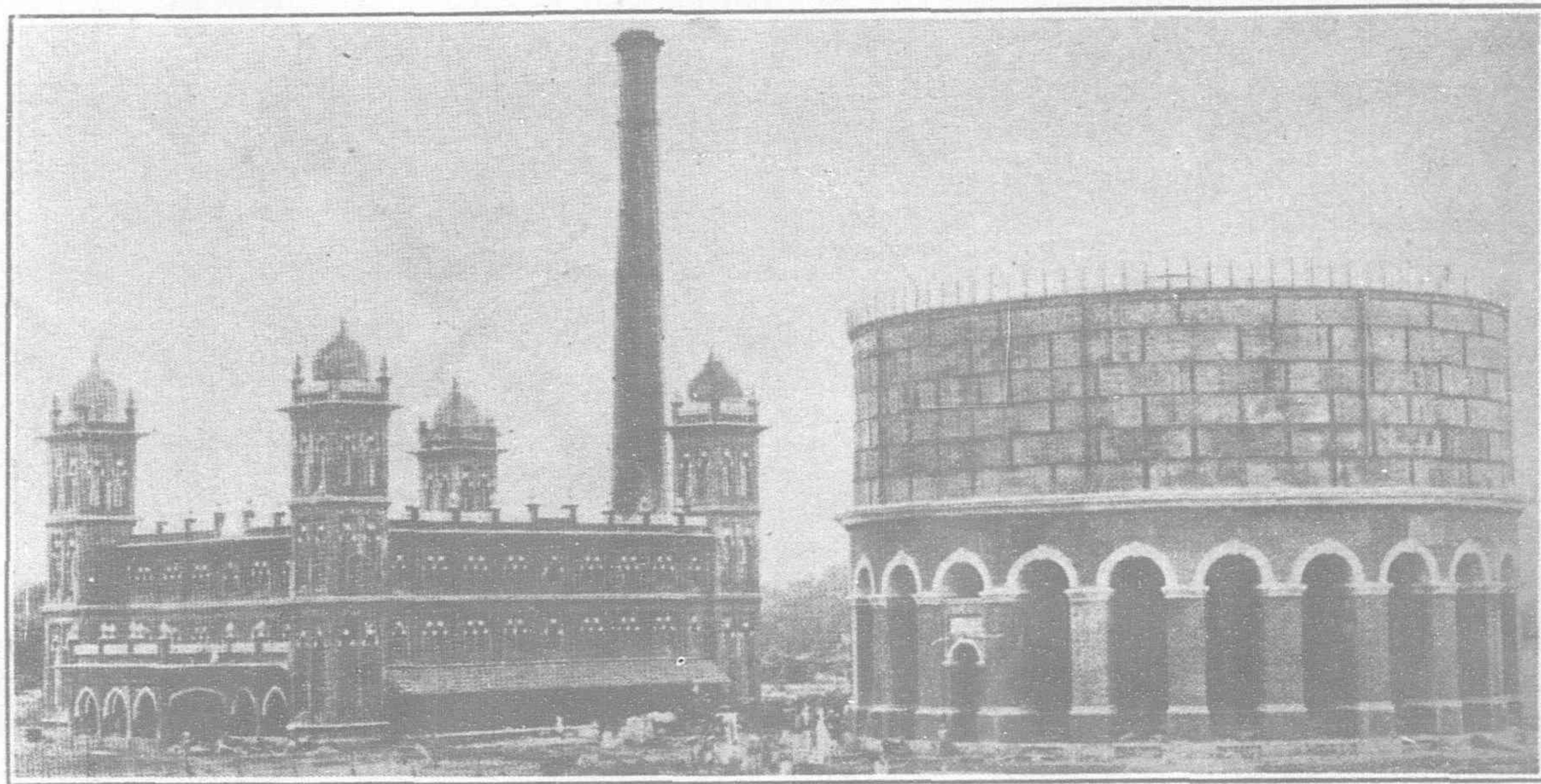


Fig. 18.—A 10,000 Kilowatt C. A. Parsons Turbo-Alternator, 50 periods, 3-phase, installed by the British Electrical & Engineering Company of China at the Shanghai Municipal Electricity Works

diligence and regard for modern standards if those who follow are to make similar headway. From all over the country come reports of electrical enterprise, small, it is true, in a large number of cases, but the start has been made, and with the present time tendency on the part of the Chinese to progress in the Western way there must come such electrical activity as has long been expected by those who are interested in the business, and by those who believe that China will sooner or later dispense with her inherited inclination towards atavism.—*Ed.*



Pumping Station and Elevated Tank

The Madras City Waterworks

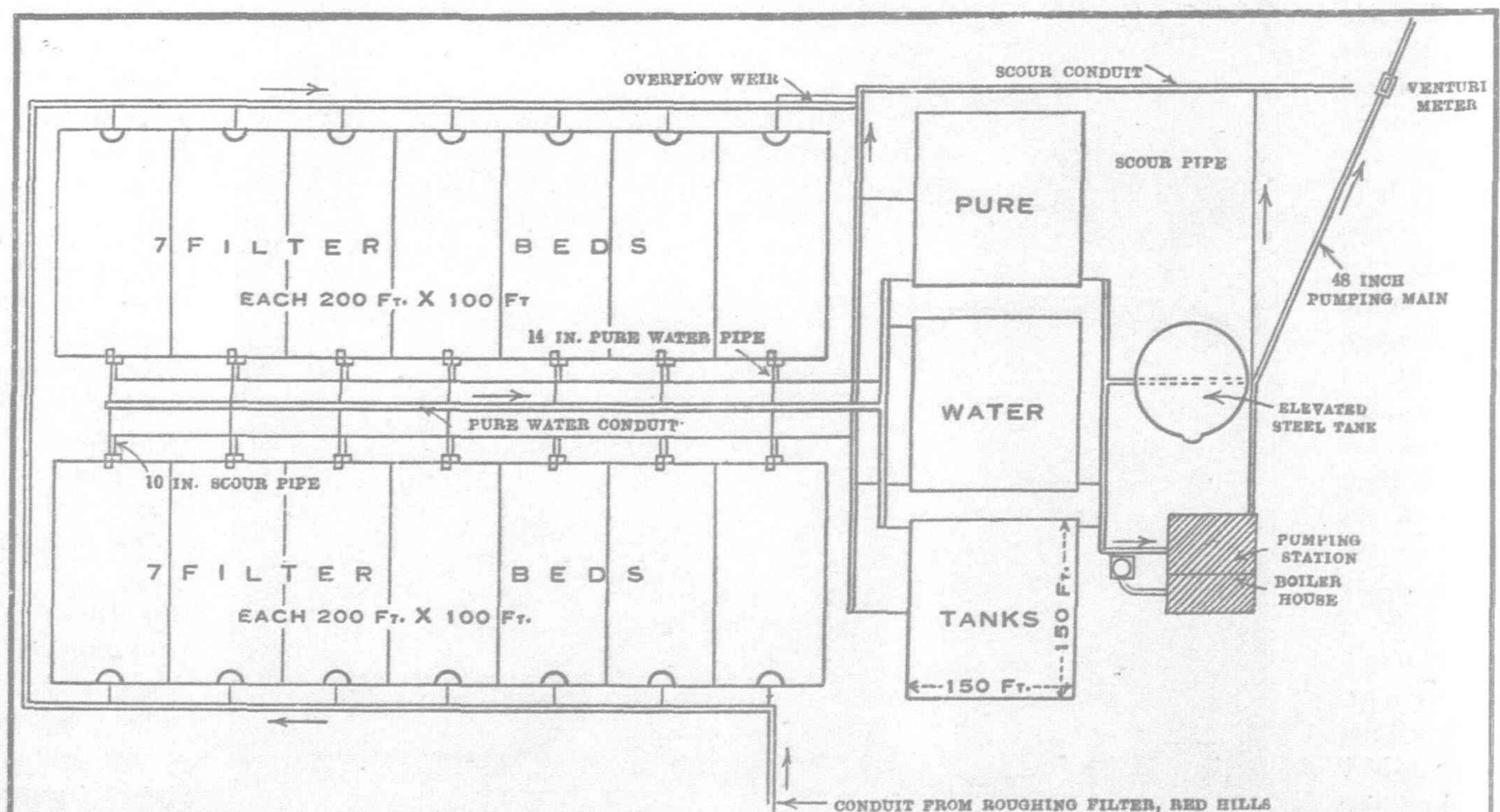
THE official description of the Madras Corporation Waterworks prepared by Mr. J. W. Madeley, M.I.C.E., etc., the special engineer who supervised their reconstruction is a most valuable contribution to Asiatic engineering literature. Mr. Madeley says that the Madras city water-supply is part of a project undertaken with the object of utilising, to the fullest economical extent, the waters of the Cortalier river and its tributaries. This is effected by means of a masonry weir build across the Cortalier river at Tamarapakkam. This weir diverts the river—excluding the greater flood discharges—into a channel feeding the Cholavaram and Red Hills Tanks which store the flood water, resulting from the monsoon rains, and render it available during the months that the river

bed is dry. From the lower of these—the Red Hills Tank—the Madras water-supply is drawn.

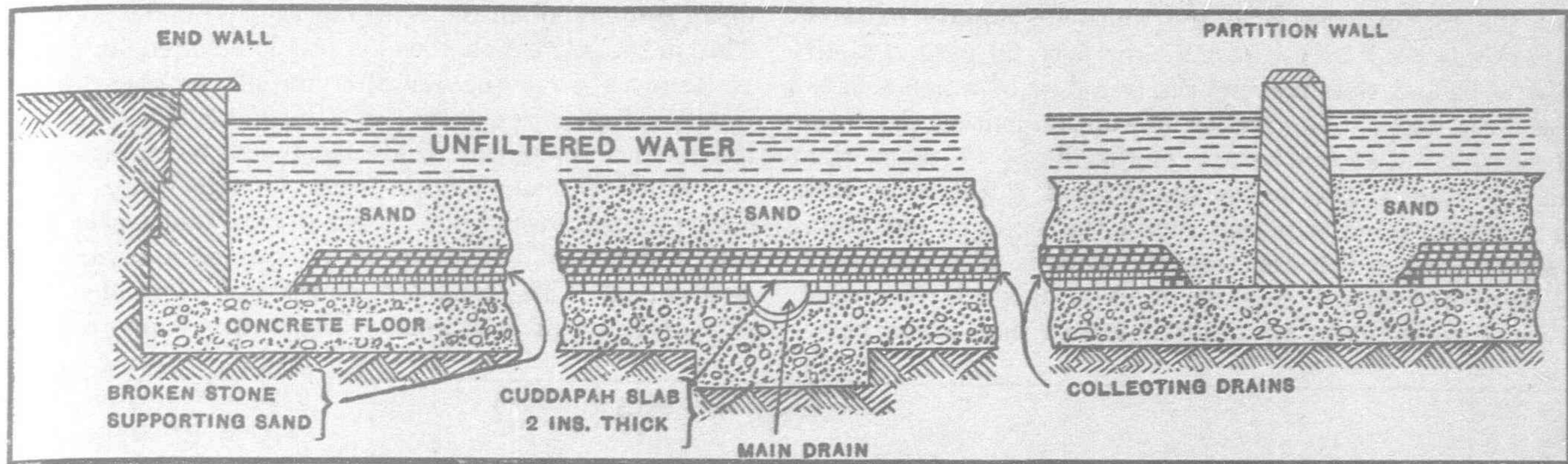
The storage capacity of the two tanks is as follows:—

	Cub. feet.
Red Hills Tank at its present Full Tank Level (44.36 G. T. S.) is	... ... ... ... 2,162,000,000
Cholavaram Tank at its present Full Tank Level (59.73 G. T. S.) is	... ... ... ... 579,000,000
Total	... 2,741,000,000

The average rainfall over the whole catchment area may be taken as 37 inches per annum.



Plan Showing General Arrangement of Filters, Pure Water Tanks, Pumping Station and Elevated Tank at Kilpauk. Scale 1-in.=200-ft.



Section of Filter Showing Arrangement of Filtering Materials. Scale 1-in=8-ft.

In order to remedy many defects in the old system, the following new works were successfully carried to completion six years ago, and formed the subject of a special paper read before the Institution of Water Engineers in December 1919.

(a) An *intake tower* in Red Hills Lake located at a point where the water is deep, so that the lake can be almost entirely emp-

ted without

pumping; (b) a *underground conduit* to replace the existing open channel prevent loss by evaporation and percolation, convey an adequate supply of water, and remove the possibility of pollution in transit; (c) sand filters to purify the water; (d) *pure water tanks* to store the fil-

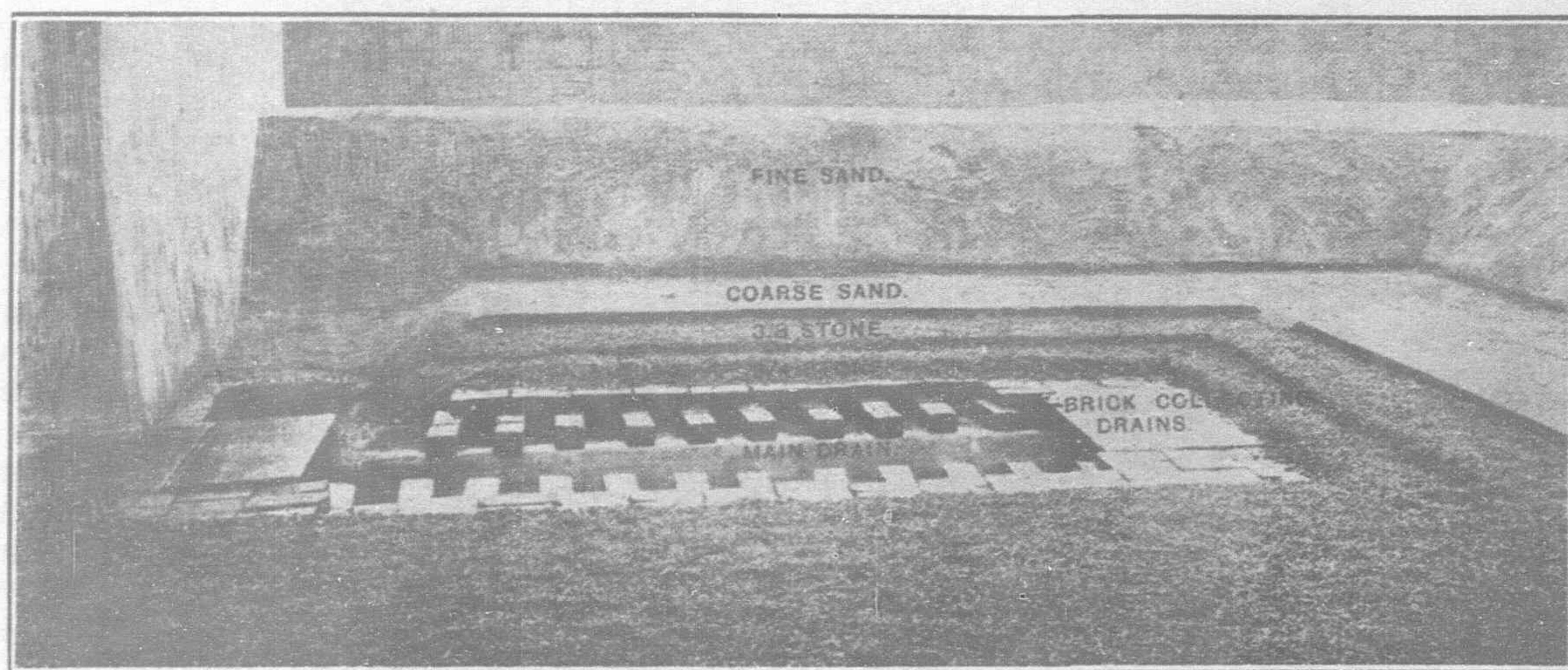
tered water; (e) *pumps* to impart to the water an adequate pressure; (f) an *elevated tank* to ensure the maintenance of a steady pressure in the mains; (g) the *remodelling, alteration and extension of the distribution system* so as to provide all the inhabitants of Madras with an adequate quantity of water under sufficient pressure.

Limitations of space confine us to a description of the more

important engineering features of the work as embraced in the construction of the filter beds and pumping plant equipment.

FILTERS.—Fourteen filters of the ordinary slow sand type are arranged in two rows of seven each, it being intended that six filters of each row—twelve in all—should be continuously in operation, allowance being made for one filter in each seven being under

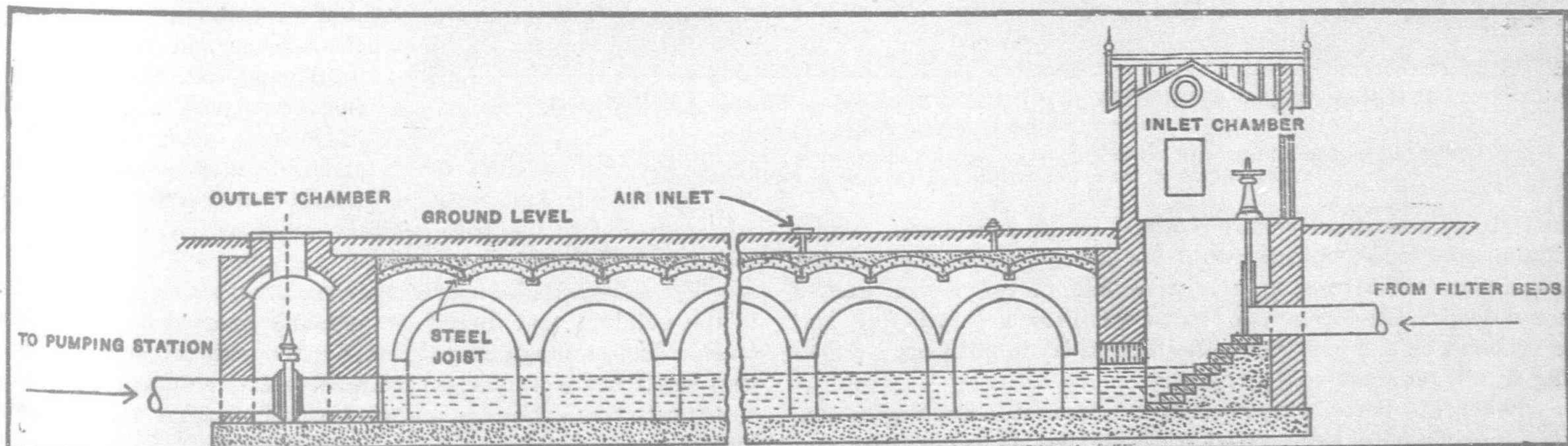
repair or being cleaned. Provision has also been made for seven additional filters, which will be constructed when required. The conduit, which brings the water from the Red Hills, is continued round the fourteen filters, and is connected to each bed by a 14-inch diameter cast-iron pipe controlled



FILTER BED SHOWING FILTERING MATERIALS.

The fine sand, 28 inches thick, is seen to be supported on 2 inches of coarse sand, which rests on a 2-inch layer of $\frac{1}{2}$ -inch stone, under which is 2 inches of $\frac{1}{2}$ -inch stone. Below the stone are the brick collecting drains leading to the main drain, which is sunk below the filter floor. The raw water is admitted at the top, is purified by passing through the sand, and leaves the filter by means of the main drain.

led by a valve, so that any filter may be isolated for cleaning or repair. Between the two rows of filters runs the *filtered water channel*, to which filtered water from each bed can be delivered through a Glenfield-Jones automatic outlet, designed to keep the rate of filtration constant. Each filter is 200 feet long and 100 feet wide, this being a convenient size for cleaning, without throwing out of use too large a filter area at a time.



Typical Section Through Underground Pure Water Tank. Scale 1-in.=16-ft.

Below the top of sand level the walls are slightly battered, in order that the sand by its own weight may be packed tightly against the walls and thus prevent the free flow of water between the sand and the walls. As a further precaution neither the drains nor the broken stone at the bottom of the filters are taken right up to the side walls. The drains are stopped 3 feet away from the walls; broken stone is placed round the ends of the drains and the space between the stone and the walls is filled with sand.

The *filtering material* consists of clean washed river sand, screened so as to eliminate all material except that which passes

drain running along the centre of the bed and sunk below the floor. This drain is 24 inches wide, and is covered by Cuddapah slabs. It leads to a rectangular filter outlet chamber which contains a Glenfield-Jones *automatic outlet regulator*, the object of which is to ensure that the rate of filtration shall be maintained constant.

PURE WATER TANKS.—The filtered water flows into three underground covered pure water storage tanks, each 150 feet square with a depth of 10 feet of water, having a capacity of 1,400,000 gallons each. The tank floor consists of 2 feet of concrete, and the side walls are of brickwork. The roof is supported on brick jack

arches, springing from steel girders resting on brick cross walls carried by arches springing from granite stone piers. Access to each tank is provided by means of manholes, and vent pipes are provided to allow the free ingress and egress of air which is very necessary, seeing that the water level is constantly varying.

Each tank is provided with a 30-inch inlet and 30-inch outlet, both fitted with sluice valves so that any tank may readily be isolated for cleaning or repairs without interfering with the working of the other tanks. A scour is also provided for emptying and cleaning each tank.

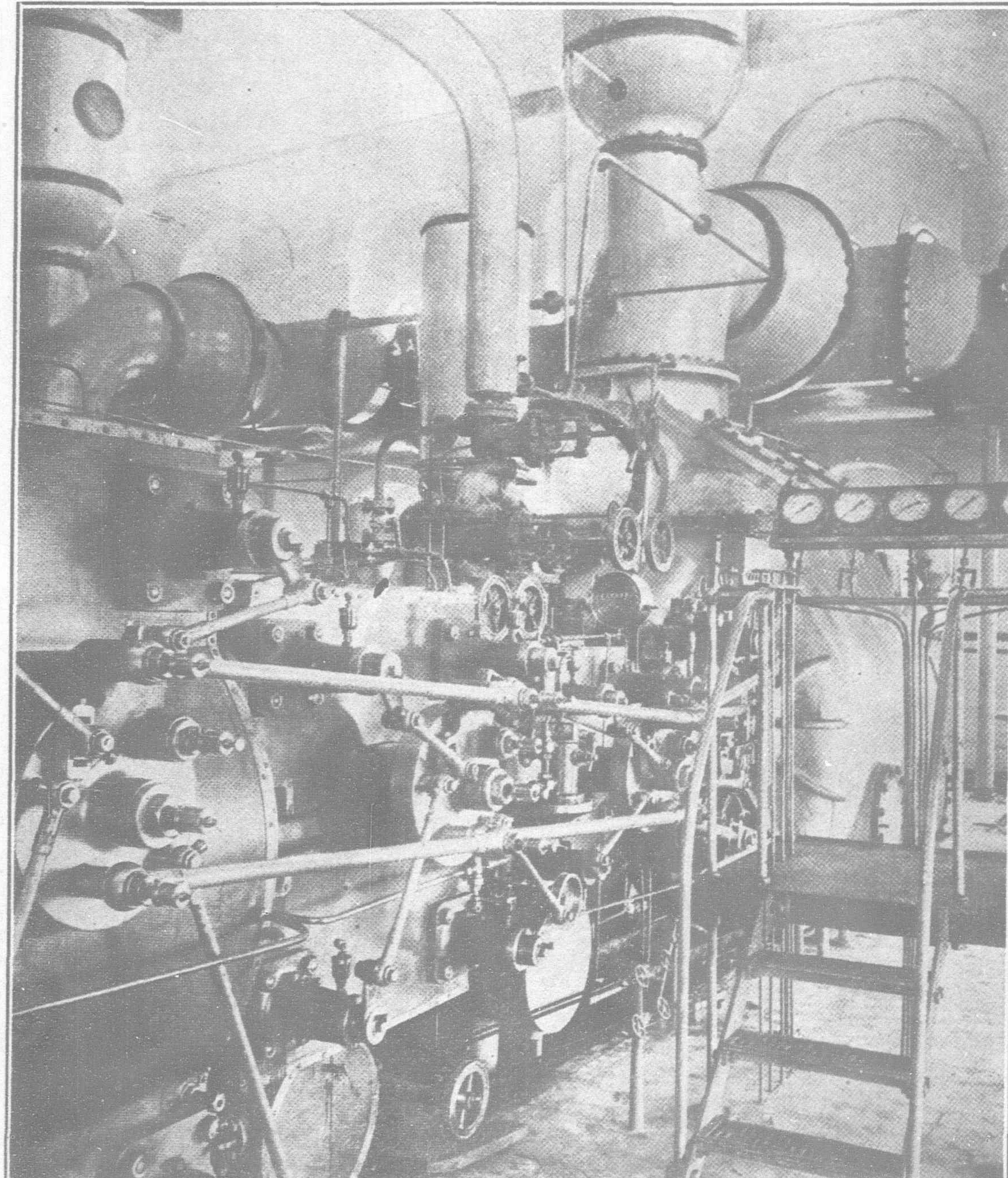
PUMPING STATION.—From the pure water tanks, the water gravitates to the suction culvert whence it will be pumped into the corporation mains through a 48-inch diameter steel main half a mile long. An elevated tank is connected with the pumping main, in order to act as a balancing tank between the pumps and the distribution system.

In designing the pumping station buildings, an endeavor has been made to give them a pleasing appearance and much attention has been paid to a suitable style of architecture. There is no doubt that environment is important. It is believed that a real economy will be obtained by providing a pumping station that is suitably designed. If it is in keeping with the machinery it has to house, if it is well ventilated, well lighted, clean, cool and inspiring both inside and out, then it is likely that the drivers will take a pride in looking after the machinery and in maintaining it clean, polished, and well oiled, perfectly

adjusted, and in the best possible condition. The working costs will thus be reduced and the life of the plant will be increased.

The towers at the four corners are intended to give distinction to the building, and to prevent it being dwarfed by the elevated tank. The suction culvert has, for the sake of economy, been kept small, but is of sufficient sectional area to allow the free passage of water to the furthest pump whatever the level in the clear water tank may be.

The chimney has been made 150 feet high to ensure a good draught with Indian coal. Experience with other plants in Madras



MADRAS CITY WATERWORKS: PUMPING STATION.—Worthington High Duty Direct Acting Pumping Engine.

Three engines and pumps, similar to this, have been installed, each pump is capable of delivering 12,000 gallons of water per minute against a total head of 80 feet.

through $\frac{1}{30}$ inch mesh and is retained on $\frac{1}{50}$ inch mesh. Under the fine sand layer, 28 inches deep, is a layer of coarse sand 2 inches deep resting on broken granite stone laid in two layers, each 2 inches deep. The top layer of stone will pass a $\frac{3}{8}$ inch ring and be retained on a $\frac{1}{8}$ inch ring; the bottom layer will pass a $\frac{3}{4}$ inch ring and be retained on a $\frac{3}{8}$ inch ring.

Below the bottom layer of stone are brick collecting drains, consisting of rows of best pressed bricks laid flat, $4\frac{1}{2}$ inches apart, and covered by another layer of bricks with open joints. Through these drains, the water makes its way to the main semi-circular

has proved that higher chimneys are required in that city than in other places where the atmosphere is less humid and where a better quality coal is obtainable.

PUMPING MACHINERY.—The pumping plant has been supplied and erected by Messrs. James Simpson & Co., of England and Calcutta. It comprises three high duty Worthington direct-acting pumping engines each capable of delivering 12,000 gallons of water per minute against a maximum total head of 80 feet. Three Babcock and Wilcox boilers are provided each capable of supplying steam continuously to any two engines working together against a total head of 80 feet.

The machinery is so arranged that any two engines can be worked from any two boilers, and that any group of engines and boilers may be worked together, and also that any engine or boiler may be cleaned or repaired without interfering with the working of the other engines and boilers.

The guaranteed consumption is 1.75-lbs. of Bengal coal per pump horse-power-hour which is an extremely low figure. The boilers are provided with automatic chain grate stokers having an area of 36 square feet each.

A Venturi meter has been inserted on the 48-inch pumping main, arranged for a maximum registration of 1,800,000 and a minimum registration of 120,000 gallons per hour. A combined recorder will be used to show by diagram the rate of flow at any moment, and by counter the total quantity passed. A water level and pump pressure recorder have also been provided, so that complete records are available for calculating the work done by the plant.

ELEVATED TANK.—The elevated tank is required to maintain a balance between the demand and supply of water to the distributary system. The demand is constantly changing throughout the day, and also changes from one day to another. To meet this fluctuation, a tank is required at such a height as will ensure an adequate pressure all over the city and of a capacity sufficiently large to meet small fluctuations in demand.

When the quantity of water pumped is greater than the consumption, the tank will store the excess, and will supply it to the city when the consumption is in excess of the quantity pumped.

The tank is constructed of steel. It is circular in plan, 104 feet in diameter, 28 feet deep from overflow level to the flat bottom and has a capacity of 1½ million gallons. In order to maintain an adequate pressure all over the city, the tank has been designed with its bottom 37 feet and the top of roof 73 feet above ground level.

The tank is supported by an external ring of brick piers and arches while steel stanchions surrounded with brickwork are used for the central supports in order to minimise the weight which, if only brick supports were used, would be greater than the safe limiting pressure on the ground on which the foundations rest.

LOAD ON TANK FOUNDATIONS.—The whole area occupied by the elevated tank, pumping station, filters, etc., is covered by a layer of black clay which would not form a satisfactory shallow foundation, as it is liable to contract and crack during dry weather, and to swell during the wet season. In various parts of Madras the expansion and contraction of a similar clay have caused serious cracks in numerous houses. At a depth of eight feet, however, there is a sandy loam on which the tank may be safely founded. The load on the foundations has been restricted to 1½ tons per square foot.

Experience has proved this to be a safe limit, and an experiment made by loading two stones, each 4 square feet in area, with 2½ tons per square foot has confirmed the teaching of experience.

WEIGHTS OF MATERIALS IN TANKS AND LOADS.—The following figures, showing the weights of materials and the loads for the elevated tank, may be of interest:—

Total weight of materials and water:—

Steel-work...	...	...	...	598 tons.
Masonry ...	...	...	...	9,723 "
Water ...	...	...	...	6,550 "
				<hr/>
			Total	16,871 "

Load on foundations:—

Total on foundations	...	...	...	16,870 tons.
Area of concrete base	...	...	...	11,500 sq. ft.
Pressure per square foot on ground	...	...	...	1.46 tons.
Area of Piers	...	...	...	866.7 sq. ft.
Pressure per square foot at base of piers	...	...	...	4.54 tons.

Sino-German Pact

THE Sino-German trade agreement was signed in Peking on May 20. It includes a declaration by Germany expressing her consent to the abrogation of German consular jurisdiction in China, and her regret at her inability to restore China's rights in Shantung. Germany also undertakes to fulfil the obligations arising for her out of the China section of the Versailles Treaty, to restore the German glacis in Peking to China, and to reimburse China for the expense of interning Germans in China.

The Various Articles

The agreement contains seven articles. The first and second deal with the mutual appointment of diplomatic and consular representatives. The third provides for mutual travelling, residential and trading rights; the jurisdiction of the local courts over the life and property of Germans in China and Chinese in Germany, and that the taxation imposed on Chinese in Germany and Germans in China shall not be higher than that payable by Chinese in China and Germans in Germany. The fourth article provides for mutual tariff autonomy, subject to a proviso that the nationals of one country shall not pay import, export and transit taxes higher than those paid by the nationals of the other.

The fifth article provides that this declaration and agreement shall form the basis of a definitive treaty.

The agreement is written in Chinese, German and French, and Article Six declares that the French text shall be the authentic one in the event of a controversy.

Article Seven fixes the date on which the treaty is to become operative as the day on which the two governments shall have given notice of their ratification of the agreement.

Exchange of Notes

An exchange of notes is attached to the agreement, interpreting certain of its articles.

The German Note says:—

(1) In connection with Article Four of the agreement China is entitled to apply Article 264 of the Versailles Treaty.

(2) That the reimbursement of the expenses of interning Germans in China is additional to the war indemnity due China, of which Germany is willing to pay (1) a portion in a lump sum equivalent to half the proceeds of the liquidated German property in China, plus half the value of the German property in China which has been sequestrated but not liquidated, the latter amount being four million dollars; and (2) the remainder in Tientsin-Pukow and Hukwang Railway bonds.

(3) Chinese property in Germany to be returned after ratification of the agreement.

(4) Germany to assist Chinese students in Germany.

German Queries Answered

The Chinese foreign minister, replying to German queries, says:—

(1) The Chinese government promises full protection to German residents in China, and undertakes that there will be no further sequestration of German property provided that China receives similar treatment from Germany.

(2) Law-suits wherein Germans are concerned shall be tried in modern courts under modern legal codes, and the assistance of German lawyers shall be permitted.

An Express Port for Shanghai

FOR some years the question of adequately providing for the future development of the port of Shanghai has received serious study from the engineers of the Whangpoo conservancy board. Notwithstanding the remarkable progress made since the commencement of operations in training the local river and deepening its channel, it has each year become more and more evident that some larger scheme would have to be drawn up and put into execution, if Shanghai is to preserve its position as the premier port of central China. The future problem of the harbor has therefore been ever before the conservancy board and various schemes have been studied and proposed as a solution.

Shanghai harbor is a typical river harbor and apart from the powerful tidal currents, the Whangpoo may be regarded as a ship canal of the first order with a navigable depth of almost 26 feet. Even with the completion of this 26-foot channel from Shanghai to the Yangtze at Woosung, the problem of a deep water approach to the city is far from being solved, as the outermost part of the Yangtze Estuary is blocked by an enormous bar—called the Fairy Flats—where only 16 feet are available at lowest low water, 26 feet at neap high water and 28 to 30 feet at spring high water. The dredging of the 32-mile channel over the Fairy Flats being out of the question, the problem of conserving for Shanghai its dominant place as the centre of Chinese trade and shipping is one that concerns every firm and property owner in the Settlement.

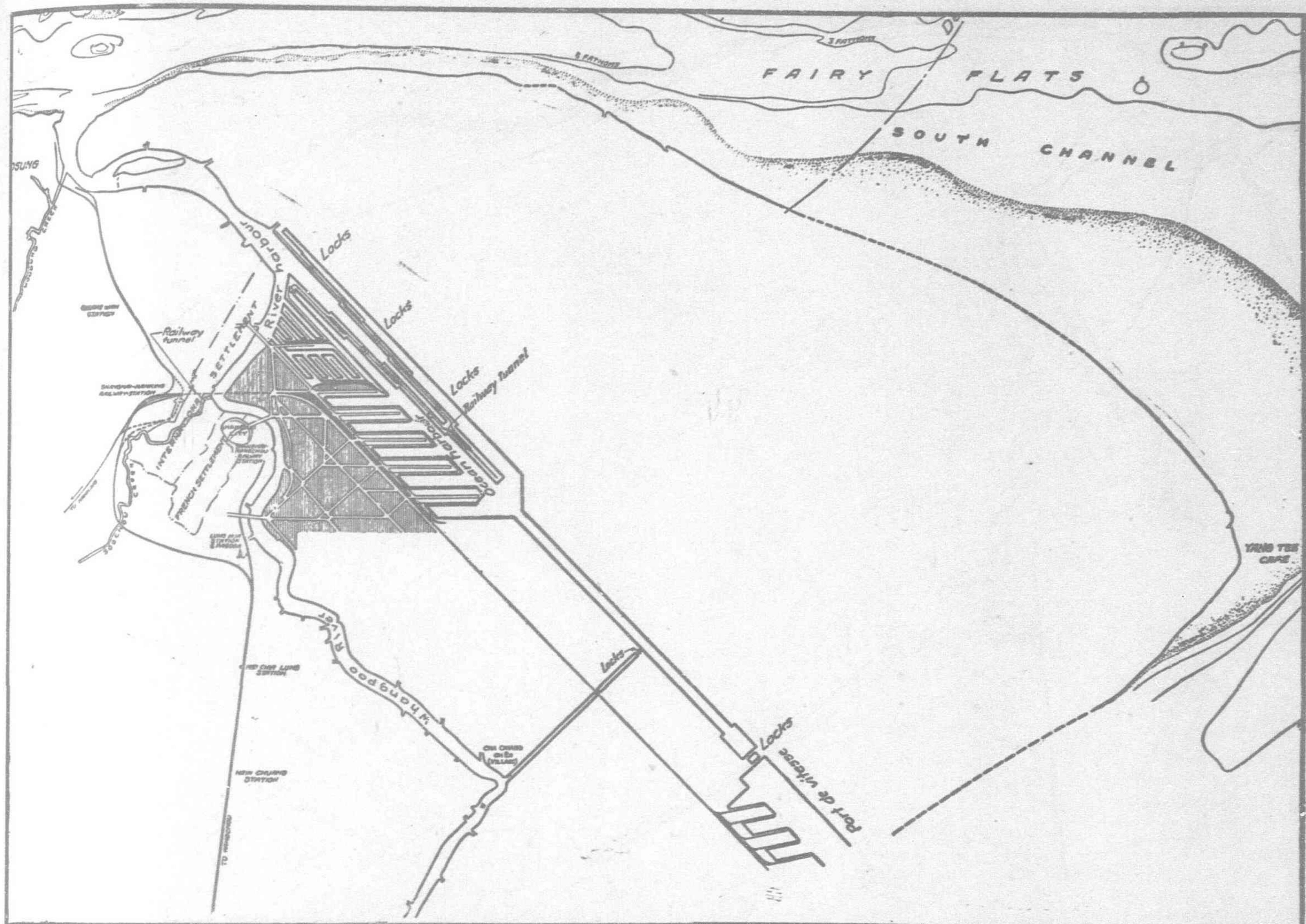
The question of the further development of the harbor, whether

and how the Fairy Flat bar can be deepened, and whether the development of the harbor lies in the future development of the present river harbor at Woosung, or a new deep water harbor at Woosung or on the south side of the Pootung Peninsula on Hangchow Bay (40 miles south of Shanghai) was raised in a special report made to the conservancy board in 1918 by three engineers—Prof. Dr. J. G. Richert, Mr. P. G. Hornell and Mr. H. von Heidenstam. It has been shown that a few miles west of Yangtze Cape at a distance of a couple of miles from the coast line, the depth at low water was 35 feet, which indicated that a port on Hangchow Bay could be constructed at much less cost than dredging a deep water channel 32 miles through the shifting Fairy Flats. The channel to be dredged for a Hangchow Bay port would be eleven times shorter and free from the danger of rapidly silting up. Such a port would involve a great saving of distance for the big ocean steamships by avoiding the troublesome Yangtze estuary. Within the last ten years there has been an increase of 100 per cent. in the size of steamers visiting Shanghai and the tendency is to increase the size. The difficulty of these vessels reaching the anchorage off Woosung is such that unless some measure is adopted to facilitate their entrance, Shanghai trade will have to be limited to the smaller size steamships.

In carrying out their investigations, the committee of engineers above mentioned submitted to the conservancy board four scheme, indicating how the problem might be met and solved. The first shown on Plan 1, implies the construction of an inlet that will



Plan No. 1.—Preliminary Plan for the Extension of Shanghai Harbor



Plan No. 2.—Showing an alternate Project for the Extension of Shanghai Harbor

reduce the distance between the sea and the Whangpoo to a minimum. It was furthermore presumed that the harbor should be located as near the coast as possible, in free communication with the sea as well as the Whangpoo. In the second plan, the inlet from the sea is constructed near the Yangtze Cape where it would not be silted up from the estuary. The canal is here drawn in such a direction with regard to the Whangpoo that the communication will be as easy as possible at the junction with the mouth of the Whangpoo. The harbor here shown is designed as a combined open harbor and dock harbor, in which the ships may call without being held up by any tedious passing through locks. In this case such transhipping arrangements might be conceived that between the open river harbor and the dock harbor—the latter being constructed for the largest vessels plying the Pacific—narrow tongues of land are left across which the goods may be transhipped between sea-going vessels and river boats. The project is merely an attempt to picture one of the innumerable solutions that had to be considered.

The main object of the harbor is and must be to meet, in the best possible way, the demand of traffic for the Yangtze district as a whole—not only for Shanghai and the Whangpoo district. The due fulfilment of this object not only requires that the entrance to the Yangtze shall be sufficient for the biggest vessels that can ply between the estuary and Hankow, but also that the through traffic is troubled in the least possible degree by the local traffic in the Shanghai harbor and in other parts of the lower Whangpoo.

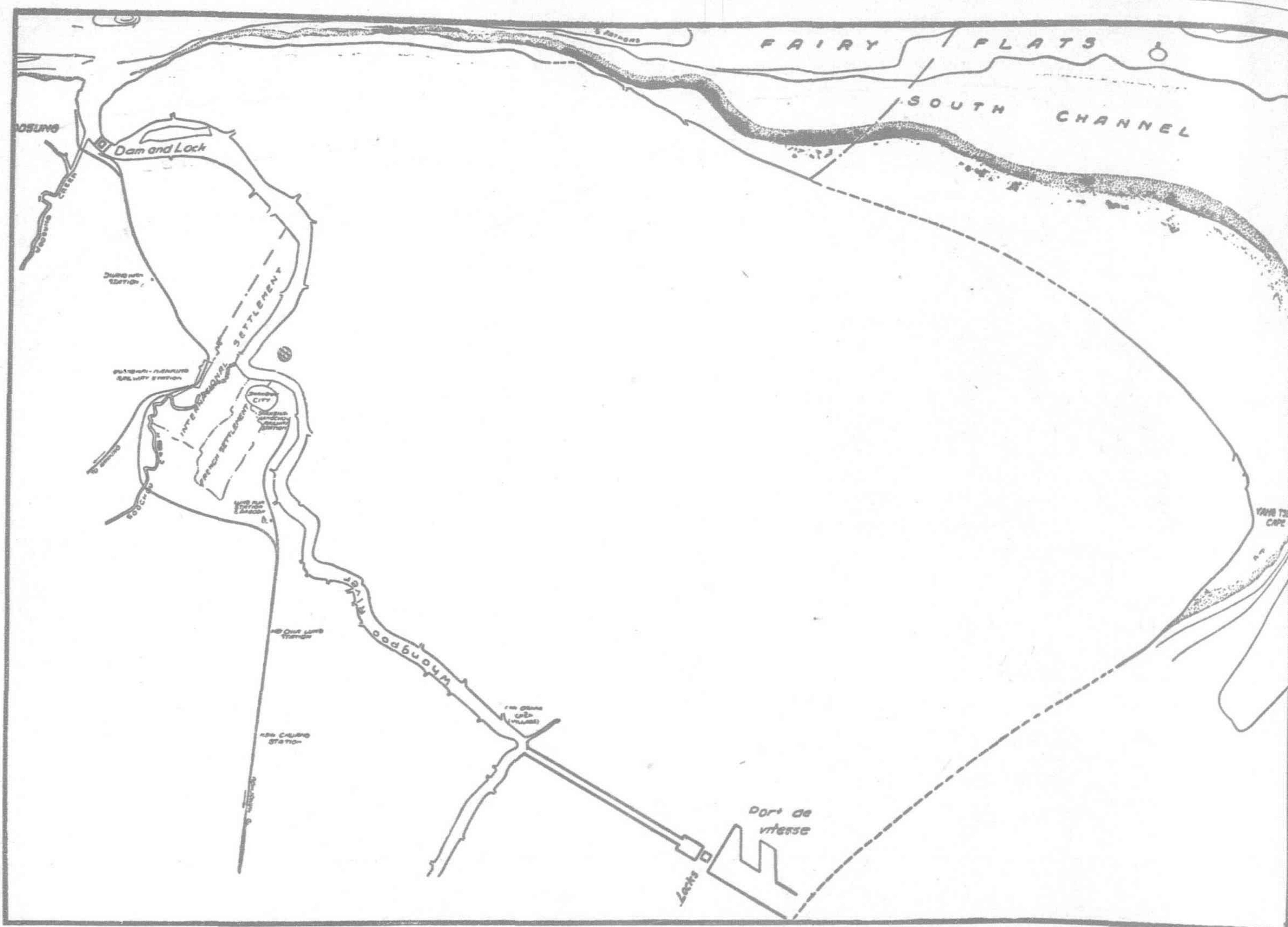
In one of the memoranda presented to the board, the suggestion was made that the lower part of the Whangpoo should be transformed into a dock harbor raising the lowest water level by about 10 feet, but the possibility of utilizing this scheme was

limited as long as big vessels would have no object to lengthening their voyages beyond Woosung.


In Plan 3 many of the difficulties encountered in the other projects were eliminated. This provides for damming up the entrance to the Whangpoo at Woosung, and connecting it with the proposed express port by a short canal at Shachiang where the river makes a right angle turn. The depth of the water in the river would be increased by about 10 feet by this scheme and would thus in most places be sufficient to meet the demands of the immediate future. The damming up would equally affect the cost of the maintenance of the channel, as by shutting out the tide water, the most serious dangers from silting would be removed. A comparative estimate of costs owing to the comparatively short stretch of canal favors the adoption of Plan 3. The engineers conclude that of all the schemes discussed, Plan 3 offers to Shanghai the greatest advantages.

Other projects having the same object in view have also been published, notably one drawn up by Mr. Sidney J. Powell, A.M.I.C.E., who proposed a harbor just inside the Yangtze Cape connected with Shanghai by railway, to be constructed as a private enterprise at a cost of Taels 17,300,000. Mr. Powell proposed the organization of a syndicate to be called the Shanghai Deep Water Port and Harbor Company, which would undertake the construction and turn it over when completed to a port trust constituted as part of the Shanghai Municipal Council with Chinese participation. Mr. Powell estimated that by an impost of one-half per cent. on the value of imports and exports passing through the port the undertaking could be paid for in six years. Calculating the gross volume of trade at Taels 600,000,000, this would provide Taels 3,000,000 per annum.

Mr. Powell's prospectus brought out very clearly the economic



Plans Nos. 3 and 4.—The Engineers conclude that Plan No. 3 offers the greatest advantages to Shanghai

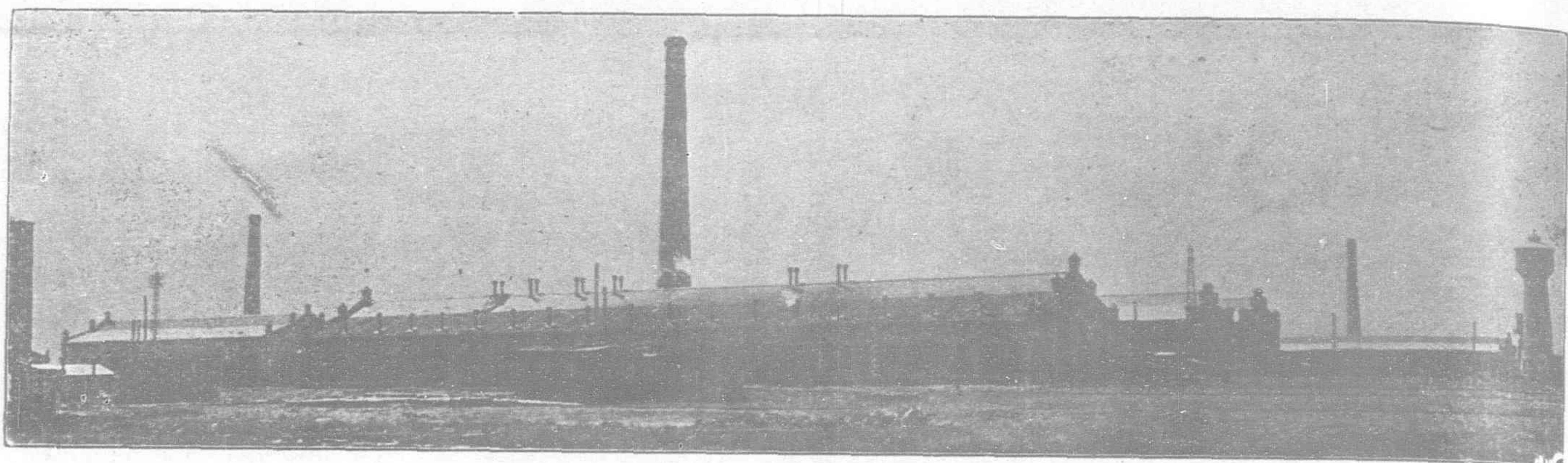


Yangtze Cape Harbor and Shanghai Deep Water Port. Map Showing Position with Railway and Water
Connections, Scheme proposed by Mr. Sidney J. Powell, A.M.I.C.E.

and other reasons calling for the construction of such a port, which, summed up, are that a harbor near the Yangtze Cape puts Shanghai 28 miles nearer to cheap transportation and saves the Settlement from imminent congestion and ultimate ruin. Besides, steamers drawing 32 feet of water can never be economically berthed in the Whangpoo. He concludes with the truism that "those ports are most isolated from the markets of the world which fail to come up to the modern requirements of trade and shipping."

Meanwhile the conservancy board has been hard at work on the problem and conducted extensive surveys of Hangchow Bay in order to provide the necessary data upon which to base eventual plans for an "Express Port." The result of these careful and pains-taking investigations have been made public in a special "Report on the Hydrology of the Hangchow Bay and Chien Tang Estuary,"

which covers a period from April 1919 to January 1921. The only harbor sites worthy of consideration in relation to Shanghai are located along the northern coast of the bay from Chapu to the Yangtze and important data is now in the possession of the board upon which a more definite selection of a port can be based. One of the most important parts of this report is the valuable collection of data concerning the celebrated Hangchow Bore. The result of the investigations has determined the depths in the bay, navigable channels and approaches thereto, the exact geographic position of the north coast of the bay and the depths off this shore. In addition, it has been determined what changes are in progress in the bay or likely to develop and the extent that tidal currents and weather affect navigation. A survey of the outlying islands of the Chusan Archipelago, has also been made.



Chinese Eastern Railway Car Shops at Harbin

Russian Foundry Practice in the Harbin Shops of the Chinese Eastern Railway

LIETEUNANT Charles E. Lee of the American Expeditionary Force known as the Russian railway service corps was sent to Harbin in November 1917 to exercise, amongst other duties, general supervision over the railway repair and maintenance shops of the Chinese Eastern Railway. Before entering the service Mr. Lee was superintendent of the South Bend Foundry Co. and is now with the Buick Motor Company at Flint, Mich. Lieutenant Lee was a good observer, and has contributed his impression to *The Foundry*, which he describes the foundry practice as he found it at the shops of the Chinese Eastern Railway. He says:

Most of the railway stock on the Trans-Siberian railroad is imported, but extensive repair shops are maintained at all the divisional points including that at Harbin, which as has already been stated is the junction where the line running to Port Arthur and Dalny joins the main line. Whatever railroad systems and methods the Russian commission studied while in the United States it is quite evident that they did not see any railroad repair shops. The methods and equipment in vogue in the railroad shop in Harbin are archaic, while the workmen move at a pace that is unbelievably slow.

The foundry building is solid brick, the walls being 30 inches thick at the bottom and ornamented on the outside by an elaborate system of pilasters and copings. The only windows in the building are in the ends and as a result the interior of the building is quite dark. A little additional light is furnished through a few poorly constructed skylights in the roof. The main bay of the shop is equipped with two 10-ton electric traveling cranes and several side wall jib cranes. The latter are never used.

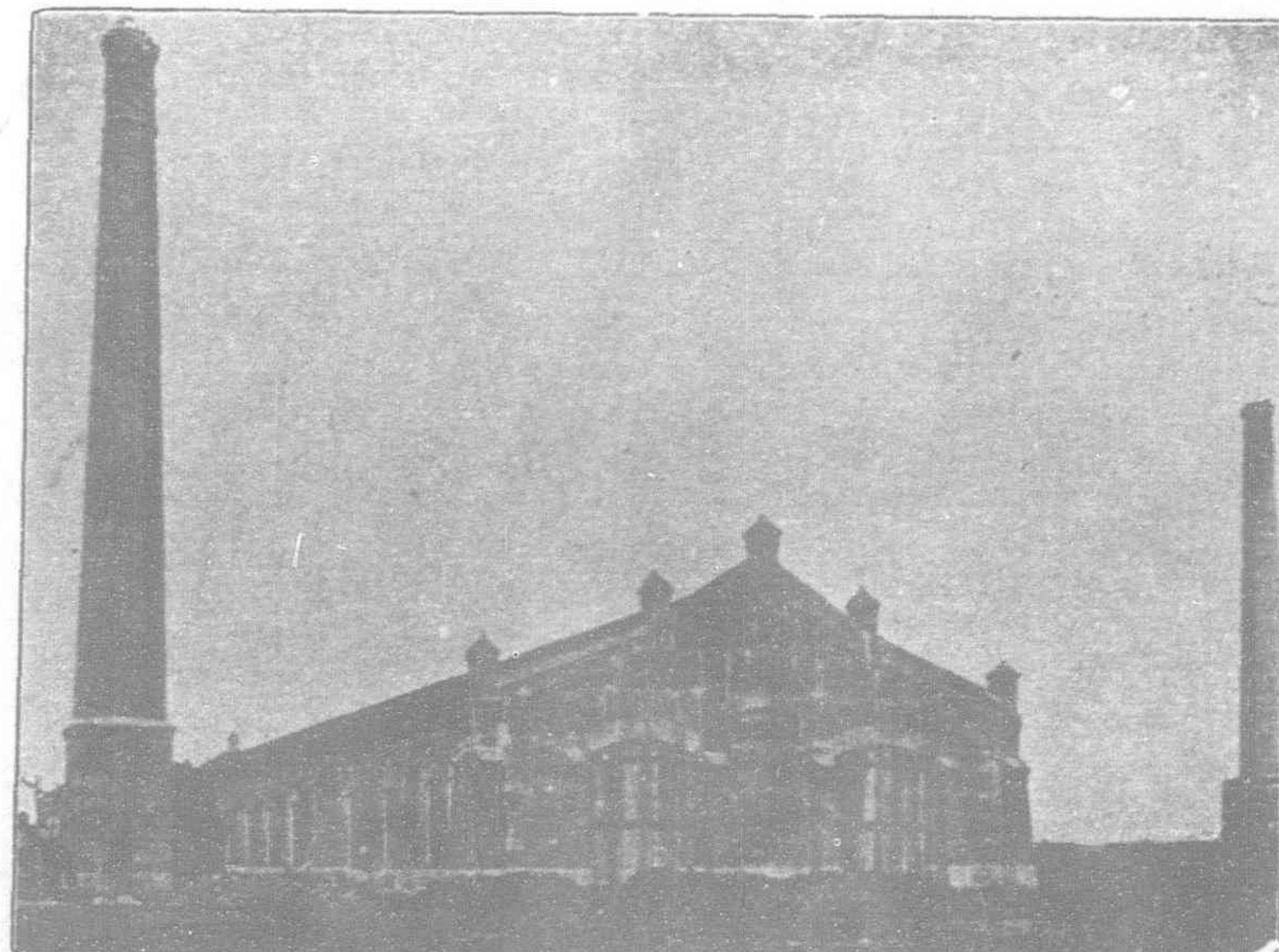
Any casting over a few hundred pounds in weight in this foundry is made in a flask and dried in the oven. All the remainder of the work, no matter how small, is bedded in the floor. The only exceptions to this rule are the oil boxes or journal boxes. These are made in flasks on a machine. The oil boxes in use on

the Russian railroads differ materially from those on American roads. They are cast in halves, the joints planted in the machine shop and the two halves afterward bolted together. The only function of the molding machine in making the boxes is to roll the drags over. The inside of the box is made with a dry sand core and the cope is perfectly flat.

No system is observed in making cores as each man makes his own cores in close proximity to his job. Small stock cores are made by boys in any convenient place. The cores are made from a natural loam which does not require any binder. A certain amount of manure is mixed with the loam to give it porosity. The cylindrical cores all are swept on barrels wound with hay rope. All the cores are dried in the same ovens as the molds. The ovens are poorly designed and constructed and as a result are slow dryers.

Two cupolas are provided for melting the metal, one of three tons, and one of five tons capacity. The metal does not accumulate in the furnace but runs into a

receiver as fast as melted. This receiver or forehearth is attached to the front of the cupola, the bottom resting on the poor. It is provided with a slag hole near the top on one side which serves to warn the melter when it is time to tap the metal. The hole also serves to remove most of the slag. The receiver is enclosed but there is a section in front which is detachable and can be removed to fix the bottom every day. After the bottom is made ready and a quantity of wood placed to dry the inside of the vessel, the doorway is daubed with clay and the door clamped tightly in place. The fire which dries the inside of the chamber also dries the mud at the door joint sufficiently hard to prevent the metal from leaking through. A vent pipe, for which there is no obvious reason, is connected to the top of the receiver and is attached higher up to the shell of the furnace. An excellent grade of iron and coke are available, both being imported from European Russia. The iron is high in silicon and phosphorus and it is possible to pour large castings although the metal is melted neither hot nor fast.



Machine Shops of Chinese Eastern Railway

A general idea of the operation of the shop may be gained from a study of the following items taken from a typical monthly report of men employed:

IRON FOUNDRY						
Molders	...	...	...	...	...	103
Helpers	...	...	...	...	...	29
Apprentices	...	...	...	...	...	23
Chippers	...	...	...	...	...	36
Cupola men	...	...	...	...	...	18
Brass furnace men	...	...	...	...	...	18
Carpenters	...	...	...	...	...	6
Painters	...	...	...	...	...	1
General labor	...	...	...	...	...	43
					—	277
BABBITT SHOP						
Mechanics	...	...	...	...	...	7
Helpers	...	...	...	...	...	2
Labor	...	...	...	...	...	5
					—	14
PATTERN SHOP						
Patternmakers	...	...	...	...	...	25
Helpers	...	...	...	...	...	1
Apprentices	...	...	...	...	...	3
Labor	...	...	...	...	...	5
					—	34
Total foundry force	...	...	...	...	...	325

In addition to the force of 325 men there was one general foreman; one foreman in the iron foundry; one in the brass foundry and one in the pattern shop. The office force included three men

and one girl. Most of the workmen were Chinese with a few Russians. Compare the number of men with the output for the month in Russian poods. The pood is 40 Russian pounds or 36 pounds avoirdupois. The total output for the month of April, 1918, is shown in the following table:

TOTAL OUTPUT FOR THE MONTH OF APRIL
TWENTY-THREE WORKING DAYS

IRON CASTINGS

Ponds	Tons
8,085	145

BRASS CASTINGS

Poods	Tons
369	6.64

BABBITT LINERS

Poods	Tons
1,333	23.99

Analyzing this table we find that the total output of iron, brass and babitt amounted to 175.63 tons for the month. There were 23 working days in the month and this gives an average of 7.64 tons a day or approximately 10 per cent. of what a similar American shop would turn out in the same time.

There is another railroad shop at Nicolsk-Ussurysk, but it is much smaller than the one at Harbin only employing 45 men altogether, all Russians. In August, 1919, this shop turned out 52,740 pounds of iron castings and 4,585 pounds of brass, an average of 2,397 pounds of iron and 208 pounds of brass a day.

Iron is cheap and the amount of return scrap is so large that no attempt is made to economize. The dump is full of iron which has been wheeled out with the refuse.

Philippine Bureau of Supply

The classified civil-service personnel of the bureau on December 31, 1919, numbered 121, all of whom were Filipinos, the only one American employee remaining in the service during the year having been granted retirement effective the date mentioned.

The year was a record year in the volume of work handled by the bureau. The purchases amounted to P18,873,789.27, or an increase of P6,210,286.59 over those of the previous year, while the sales totaled P18,159,825.82, or an excess of P5,317,110.87 over those of 1918. The gross earnings, exclusive of the division of cold storage, amounted to P1,086,995.63, which exceeds those of the previous year by P186,292.45; and the cost of operation was P462,176.30, which is P85,983.97 over that of 1918, thus giving a net gain of P624,819.33, or an increase of P100,308.48 over the profits of the previous year. This does not include the purchase and sale of rice.

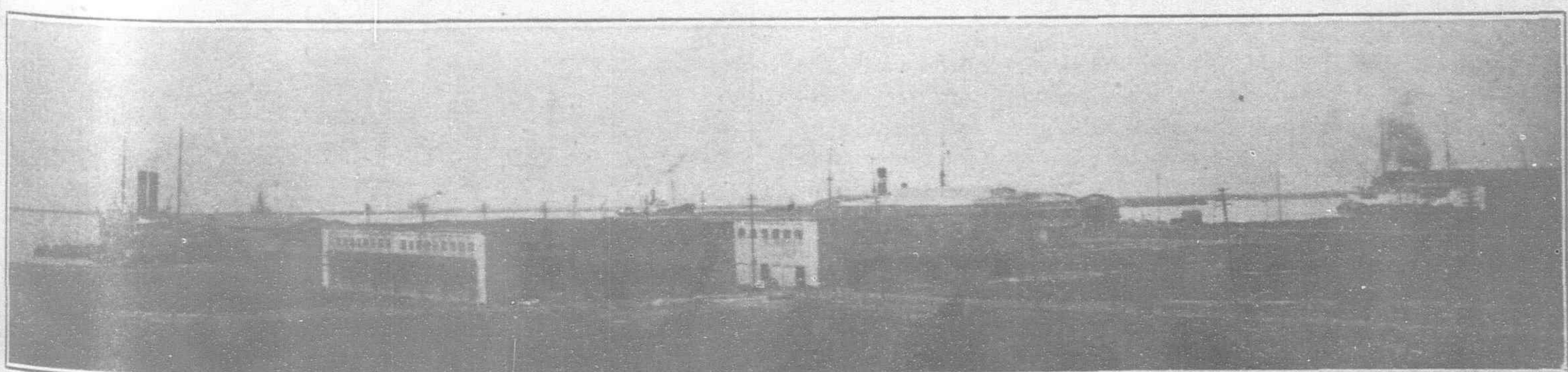
From the operation of the ice plant the bureau obtained a gross earning of P723,117.31, or an increase of P147,195.47 over that of the previous year; the expenses amounted to P486,946.11 or an excess of P58,342.74 over those of 1918, thus leaving a gain of P236,171.20 as compared with P147,318.47 for 1918. If from this amount the cost of furniture and equipment aggregating P5,621.17 bought during the year is deducted, a net gain of P230,550.03 would still remain.

The number of requisitions received was 16,464 or 1,470 more than those of the previous year, giving an average of 1,372 per month. Of these requisitions 9,903 came from bureaus and offices of the insular government and 7,461 from provinces and municipalities.

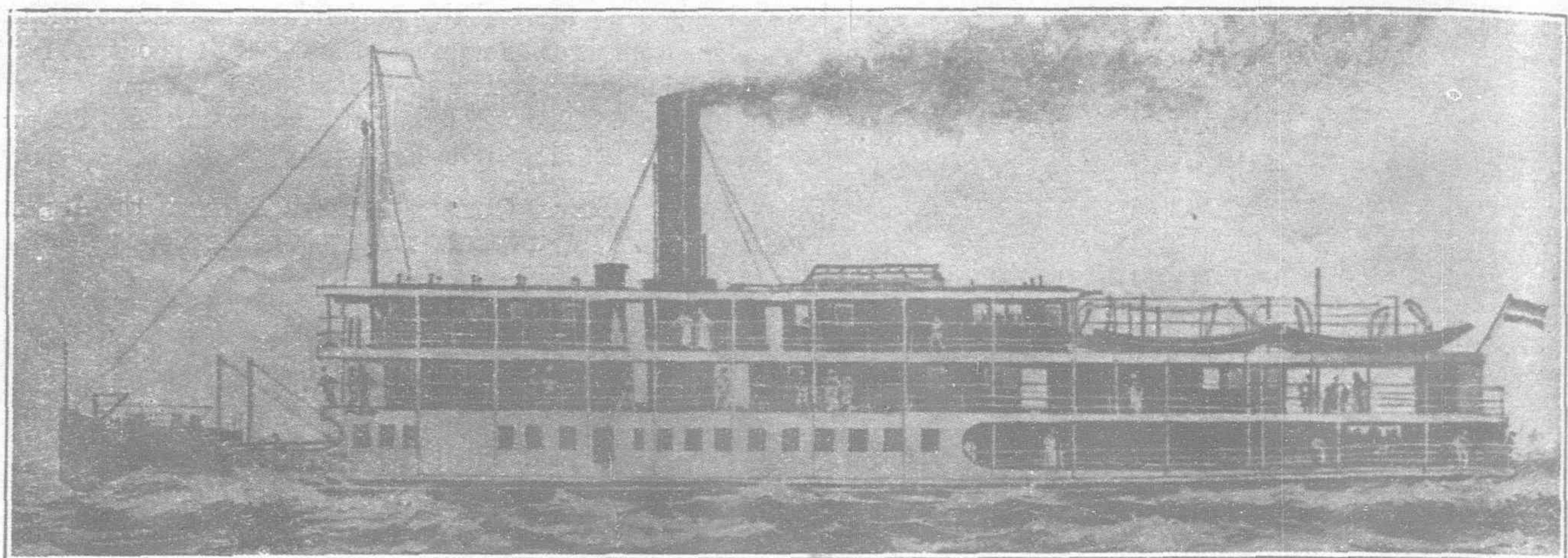
The deliveries made totalled 648,617 packages, 1,155,096 board feet of lumber, and 49,575 tons of cargo shipped by water; 278,982 packages, 2,432,060 board feet of lumber and 14,809 tons of cargo sent by rail; and 5,008,891 packages, 3,176,436 board feet of lumber and 61,477 tons of cargo sent within the limits of the city of Manila.

The year was also a record year for the lumber yard and sawmill. The receipts and issues of the lumber yard amounted to 6,833,830 board feet and 4,342,445 board feet, respectively, as against only 3,985,336 received and 4,220,270 issued during the previous year. The sawmill turned out 3,901,322 board feet of lumber of different finishes, producing a revenue of P49,111.64.

In the rice crisis which occurred during the year, this bureau played an important part which did much to relieve the people of its disastrous effects. This consisted in providing this cereal to those regions where shortage existed and in making an equitable distribution of the same. The number of sacks of rice purchased to fill the numerous requisitions received during the period from July 1 to December 31, 1919, was 631,395 sacks valued at P10,536,293.88. The sales amounted to P10,983,417.47.



Bureau of Supply Bodegas, Manila City



Shallow Draft Steamer "Anning." Designed and constructed by Yarrow & Co., Ltd., Scotstoun, Glasgow, and fitted with Yarrow's Patent Improved Balanced Flap. Length overall, 190-ft. Beam moulded, 30-ft. Depth moulded to Main Deck, 8-ft. Draft with 260 tons on board, 5-ft. Speed, 15 miles per hour.

A New Yarrow Steamer for the Yangtze

ON May 9th, Mrs. H. E. Arnold performed the ceremony of launching the s.s. *Anning* at the yards of the New Shipbuilding and Engineering Works at Shanghai. The vessel was shipped out from the builders, Messrs. Yarrow & Company, of Glasgow, in a "knock-down" state and constructed at the above yards.

The *Anning* has a length overall of 190-ft., beam 30-ft., and the depth moulded to main deck 8-ft. The hull is divided into 19 compartments by transverse and longitudinal bulkheads, and watertight doors are fitted to the bunker bulkheads.

There are four decks, namely, the main decks upper deck, boat deck, and awning deck, as shown on the accompanying photograph.

The accommodation for European and first-class Chinese passengers is on the boat deck, and consists of a dining saloon, six 2-berth staterooms for Europeans; a dining saloon, and nine 2-berth and one 4-berth cabins for first-class Chinese. Also pantry, galley, bathroom, w.cs., cook and boys' cabin.

The accommodation on the upper deck consists of captain's, chief engineer's, and chief officer's cabins, second-class Chinese dining saloon, nineteen 4-berth and six 2-berth second-class cabins, purser's office and cabin, bathroom and w.cs.

On the main deck there is accommodation for 206 Chinese steerage passengers, fifteen firemen and three Chinese engineers.

In the forecastle there is accommodation for four petty officers and twelve men, and there is also a mess place for fourteen cooks and boys.

The vessel is lighted throughout by electric light, the current being supplied by an oil-driven dynamo so as to obviate the necessity of keeping up steam when the vessel is moored for the night.

There are five separate holds for cargo, having a total capacity of 16,000 cubic feet, which corresponds with a deadweight capacity of about 260 tons at 5-ft. draft.

There is a special double-headed steam capstan forward, one head being arranged for working the anchors and for ordinary warping purposes, the other being specially designed for warping up the rapids at such times as these may be too strong for the steamer to navigate under her own power. Large rollers are fitted on the berthing for bringing in the warp.

Strong bollards and fairleads are arranged both forward and aft.

The main propelling machinery consists of two sets of triple-expansion surface condensing engines of Yarrow & Co.'s standard design, having large bearing surfaces suitable for the special service in which this vessel will be engaged. The engines are capable of developing about 2,000 I.H.P. collectively.

The condenser is of the "Weir Uniflux" type, and the usual air and circulating pumps and other auxiliary engines are fitted, including an evaporating plant.

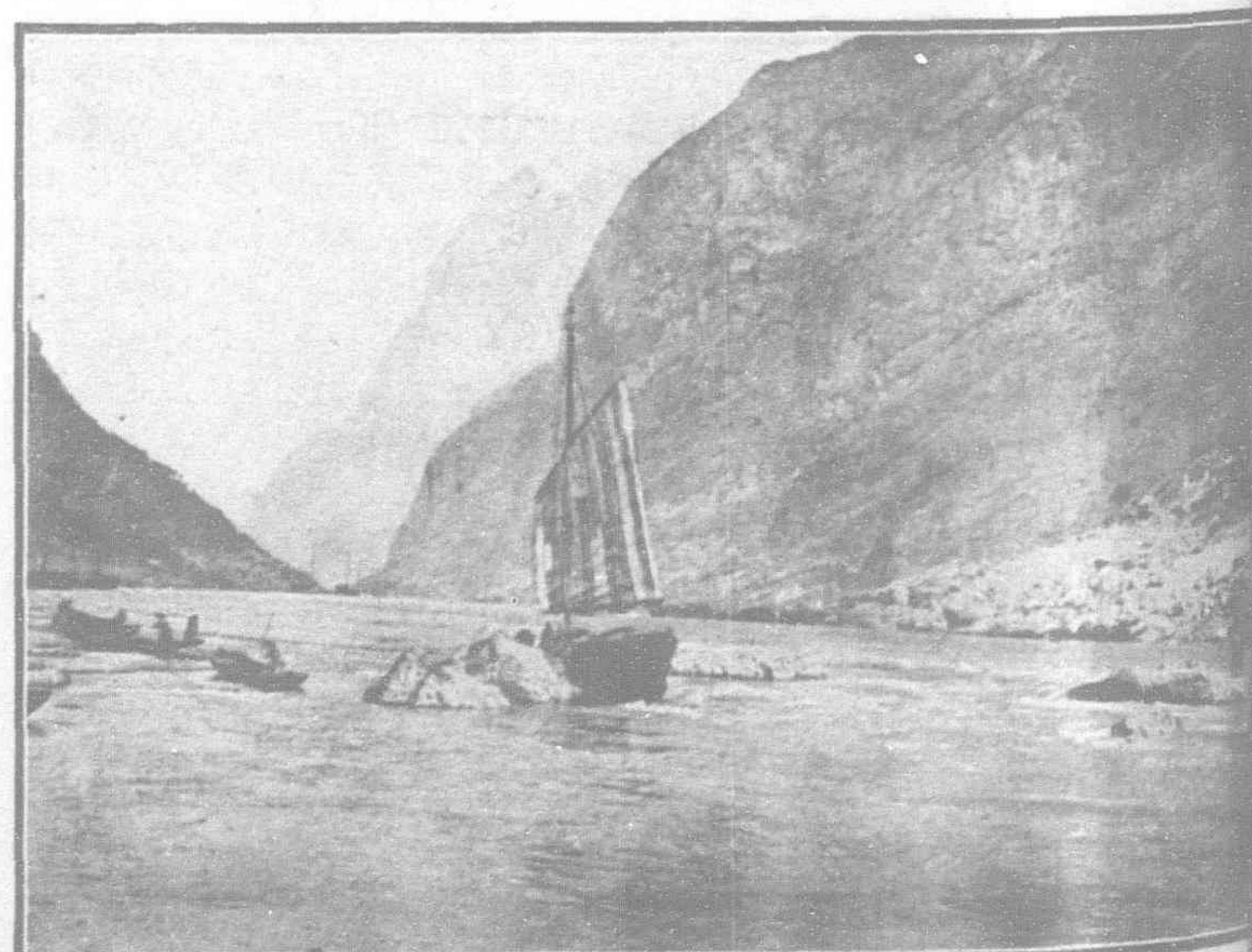
The boilers are two in number, of the Yarrow patent double-ended type, each boiler being fitted with an independent funnel; they are arranged to burn coal only, and two fans are fitted for providing forced draught.

The main and auxiliary feed pumps are by G. and J. Weir, Ltd.

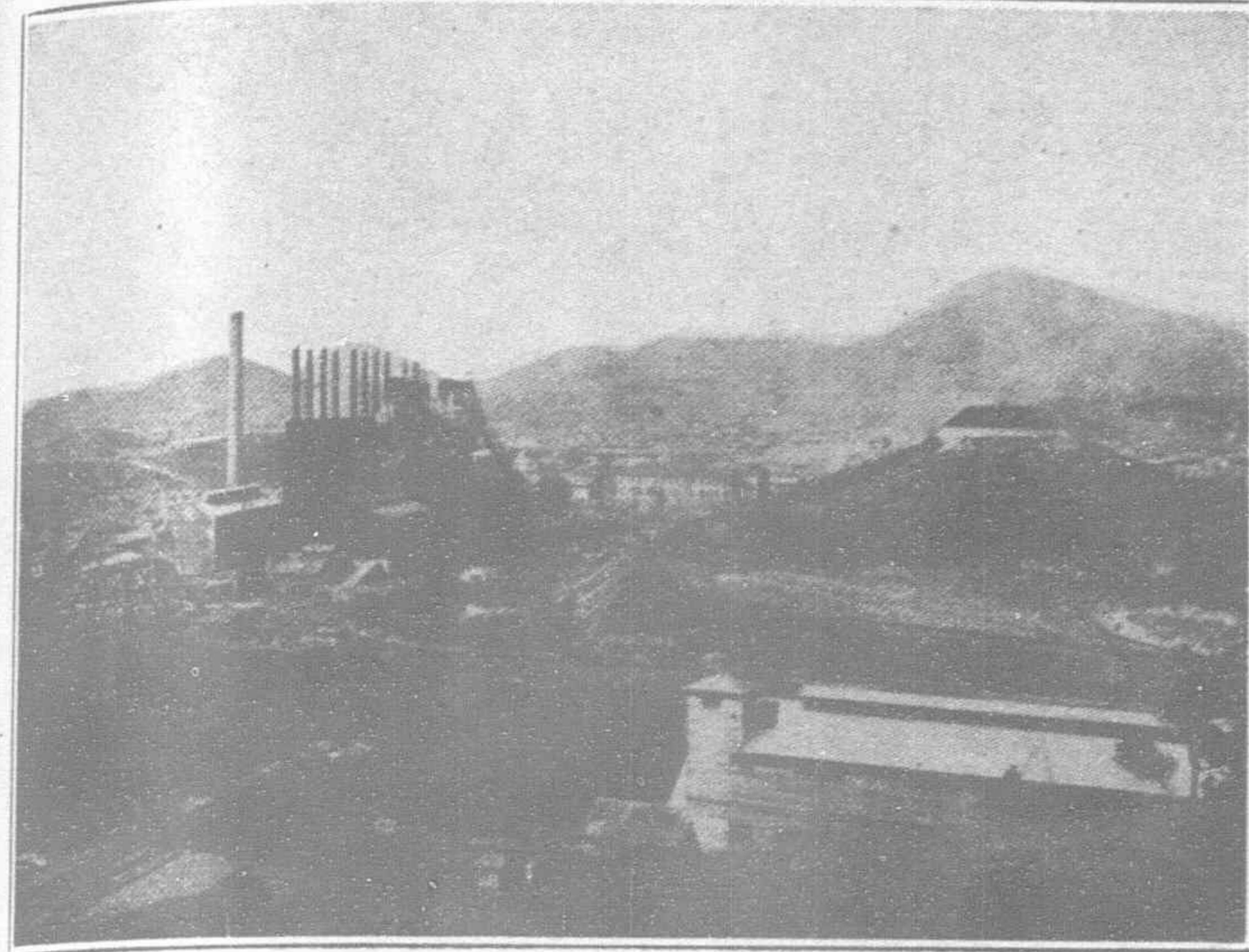
The propellers are of large diameter suitably designed for transmitting the large power which the engines develop. They work in tunnels fitted at the after end with the Yarrow patent automatic flap, which system was so successful on the *Shu-hun* and numerous other shallow draft vessels, and which ensures the maximum propulsive efficiency at whatever draft the vessel may be loaded to.

A large and more powerful vessel for the same run is under construction at Messrs. Yarrow's works, which will also be arranged for carrying passengers and cargo, and is equipped with the same arrangement of propeller tunnel and hinged flap.

It is expected that there will be great developments in the shipping on this reach of the river. There is no doubt but that many vessels similar to the *Anning* could be most profitably employed there.



On the Upper Yangtze where the "Anning" will ply.



General View of the Kenjiho Iron and Steel Works



View of Casting Side of Open Hearth Furnaces, Kenjiho

Kenjiho Iron & Steel Works

ROM a national point of view, and with the ever increasing necessity of meeting the growing demand for shipbuilding materials and all other engineering purposes, the Mitsubishi Goshi Kaisha has for many years paid special attention to the manufacture of iron and steel and has given much study to this branch of business. Since the company bought the iron mine at Kenjiho, Kodai-do, Korea, in 1911, it has gradually absorbed the neighboring mines. In 1913, when Taiho-men colliery, Heian-nan-do, Korea, and the limestone mines at Kenjiho came into the possession of the company, a large scheme was projected for iron production at Kenjiho, and in May 1915, the Preparatory Iron Foundry Department was duly opened for the purpose of establishing the iron works. These preparations having been satisfactorily completed, the Mitsubishi Seitetsu Kaisha, Limited (The Mitsubishi Iron & Steel Company, Ltd.) with a capital of Y.30,000,000 was established in October, 1917, and all the aforesaid business and plant were transferred to this new company.

The first tapping of the blast furnace was performed in June 1918, and the production has been going on smoothly ever since. The plant comprises the following:—

Blast Furnace Department.—Two stacks, 70 by 19 feet, each with four 92 by 20 feet McLure central combustion type hot blast stoves; fuel consumed own prepared; total annual capacity 100,000 gross tons foundry and open hearth furnace pig iron.

By-Product Coke Department.—Fifty Wilputte ovens, each 39-ft. 5-in. long, 15-ft. 5½-in. high, 17½-in. mean width and 13

gross ton charge capacity: total annual coking capacity 128,000 tons: By-Product: 2,000 tons sulphuric acid, 1,800 tons sulphate of ammonia, 4,600 tons pitch, 800 tons heavy oil, 900 tons medium oil, 250 tons light oil and 600 tons naphthalene.

Open Hearth Department.—Contains one 200-ton molten metal mixer (under construction) and three 50 gross ton open-hearth steel furnaces: fuel consumed, producer gas; annual capacity 100,000 gross tons ingots.

Blooming Mill.—Contains four hole, six ingot, vertical ingot heating furnaces and one two-high reversible 900 m.m. mill: annual capacity 300,000 steel blooms and slabs.

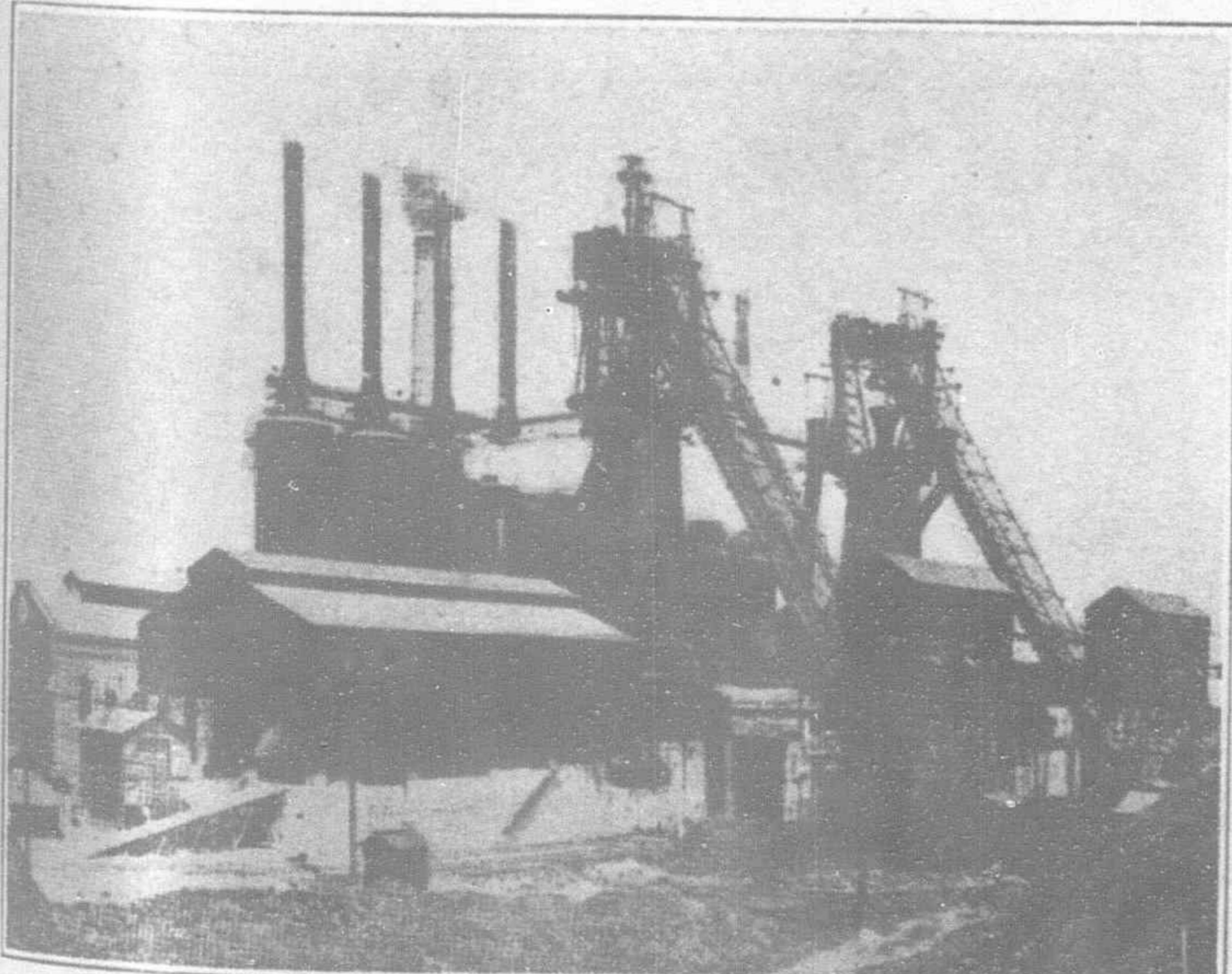
Structural Mill.—Contains one Siemen's continuous bloom heating furnace and one 28 inch three-high roughing and finishing mill train; annual capacity gross 900,000 tons structural and other shapes.

Plate Mill.—Contains one three-hole, four ingot, vertical ingot heating furnace, two Siemen's horizontal charging reheating furnaces and one 110 inch three-high thick plate mill: annual capacity 100,000 gross tons ship, boiler, structural, etc., plates up to 2-in. thick, 9 feet wide and 35 feet long.

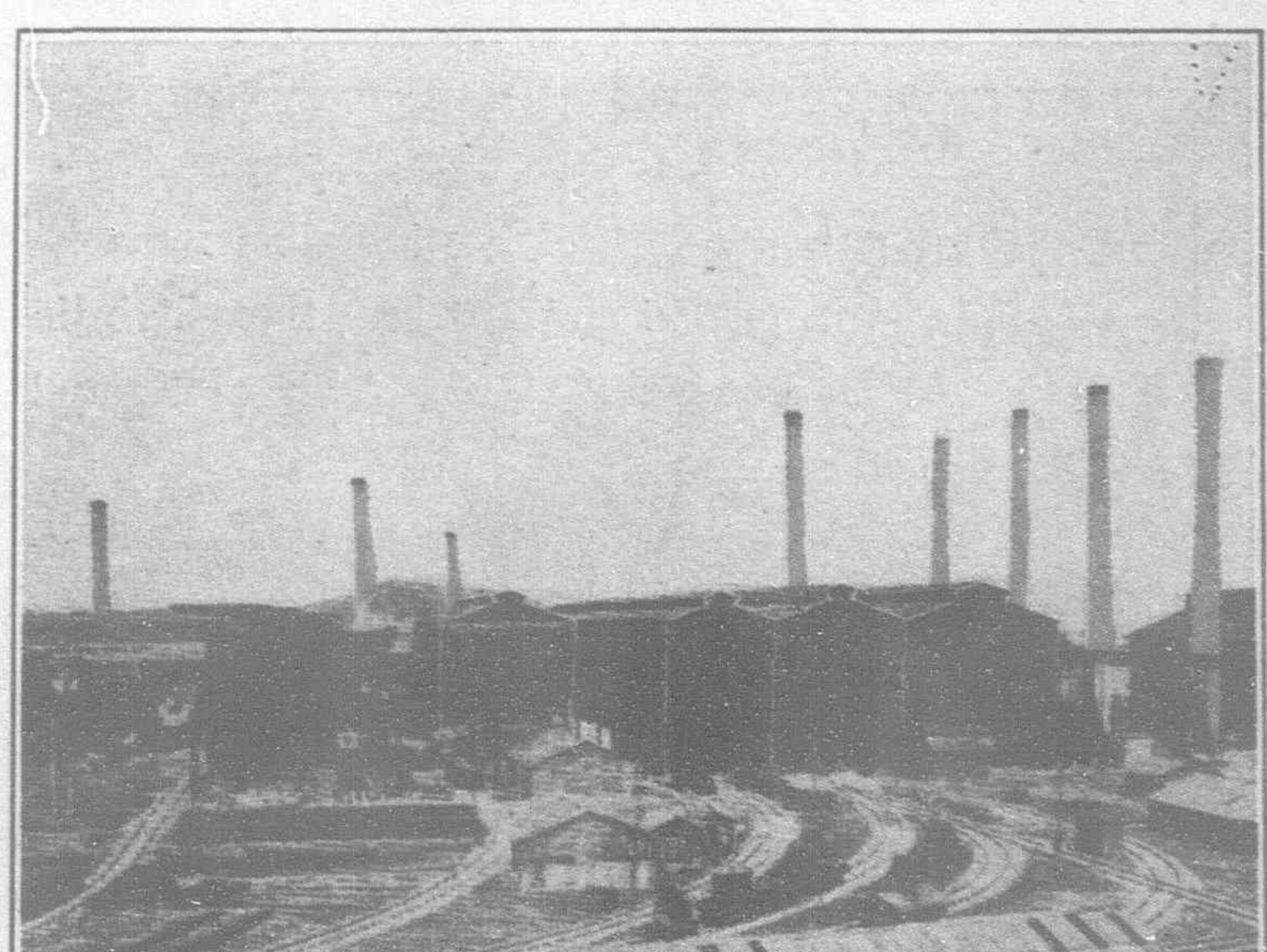
Brick Department.—Annual capacity 6,000 gross tons fire bricks and more than seven millions slag bricks.

Name of Colliery.—Taiho-men (Heian-Nan-Do).

Names of Ore Mines.—Shorin-men (Kokaido), Kasei-men (Kokaido), Nido-men (Kokaido), Sainei-men (Kokaido), Ginzan-men (Kokaido), Furin-men (Heian-Nando) and Taikwan-men (Keikido).



Blast Furnace Plant, Kenjiho



General View of Steel Works from the East, Kenjiho

German New Guinea

Australia's New Task

By Thomas J. McMahon, F.R.G.S.

GERMAN New Guinea is a second Java. It is reckoned that under a progressive administration in ten years time it will vie with the present commercial progress of Java. Cocoanut, rubber, coffee, cocoa, and many tropical products which grow in the most prolific manner, can be cultivated cheaply and quickly.

Under its German government prior to the war the territory was exceedingly prosperous and German enterprises were much encouraged. The result to-day is that the plantations of cocoanut, particularly, are some of the largest, finest, and most profitable in the island world. There were many signs of wealth with the German planter. His mansion was one of true German commodiousness, and comfort, invariably surrounded by a small, well-kept park, bright gardens in which fountains played, and statuary gleamed. The planter lived in a style comfortable only with great wealth, and he was famous for his hospitality, and the lavishness of his entertainments. It cannot be questioned but that the Germans are remarkable colonizers; and no island group in the whole of the South Pacific was so widely, and successfully developed than German New Guinea.

In the time of German ownership this scattered territory comprised Kaiser Wilhelm's land—a large slice of the big island of New Guinea—the Bismarck Archipelago and groups of small islands dotted over a vast expanse of sea. Then there were the German Solomons, the tiny island of Nauru, famous for its phosphate, the Carolines, Marshalls, and Marianne groups, in extent the whole many thousands of square miles. The population of the territory was and is still approximately 5,000 Germans, 300 Australians, 1,000 Chinese, 1,000 Japanese and Malays, and 700,000 natives. To-day under the powers of a mandate German New Guinea is being administered by Australia. All through the war, and up to two

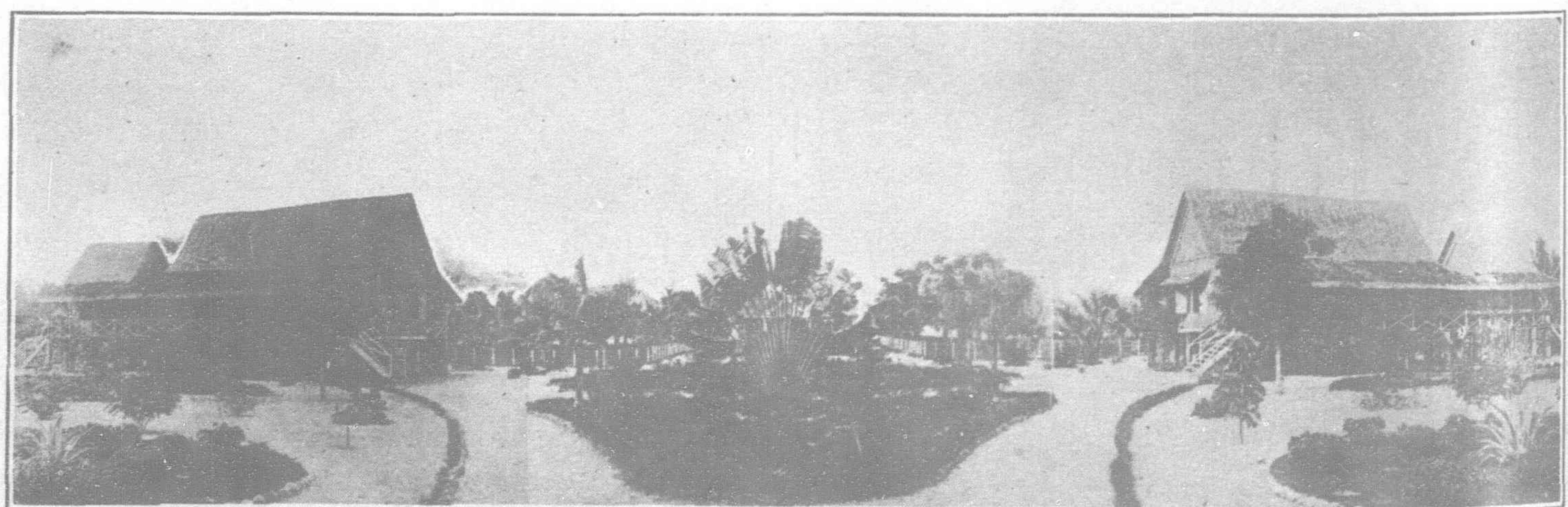
years ago the commercial prospects of the group were eminently satisfactory, but Australian industrialism in its frequent strikes and its hold-up of island shipping for long periods, has seriously crippled trade, and hampered developments. And now the Australian federal government in its unlimited powers under the mandate has decided that all German settlers will be bought out, and deported. The work of expropriation of German estates has been going on for some time, and the German settlers are being warmly welcomed in Java, a degree of anxiety is being felt by some Australians as to the wisdom of this action, and the experiment of placing Australian soldiers on the plantations is being watched with the greatest interest and concern. Should Australian administration of the group be progressive and free from the influence of commonwealth politics, then very few years will be enough to show that Australia has been given the richest territory prize of the war.

Australian military administration of German New Guinea during the war was most competent and successful, and its legislation dealing with the health of the white settlers, in combating the vicious mosquito and malaria is some of the wisest in the tropic world. The most drastic regulations for

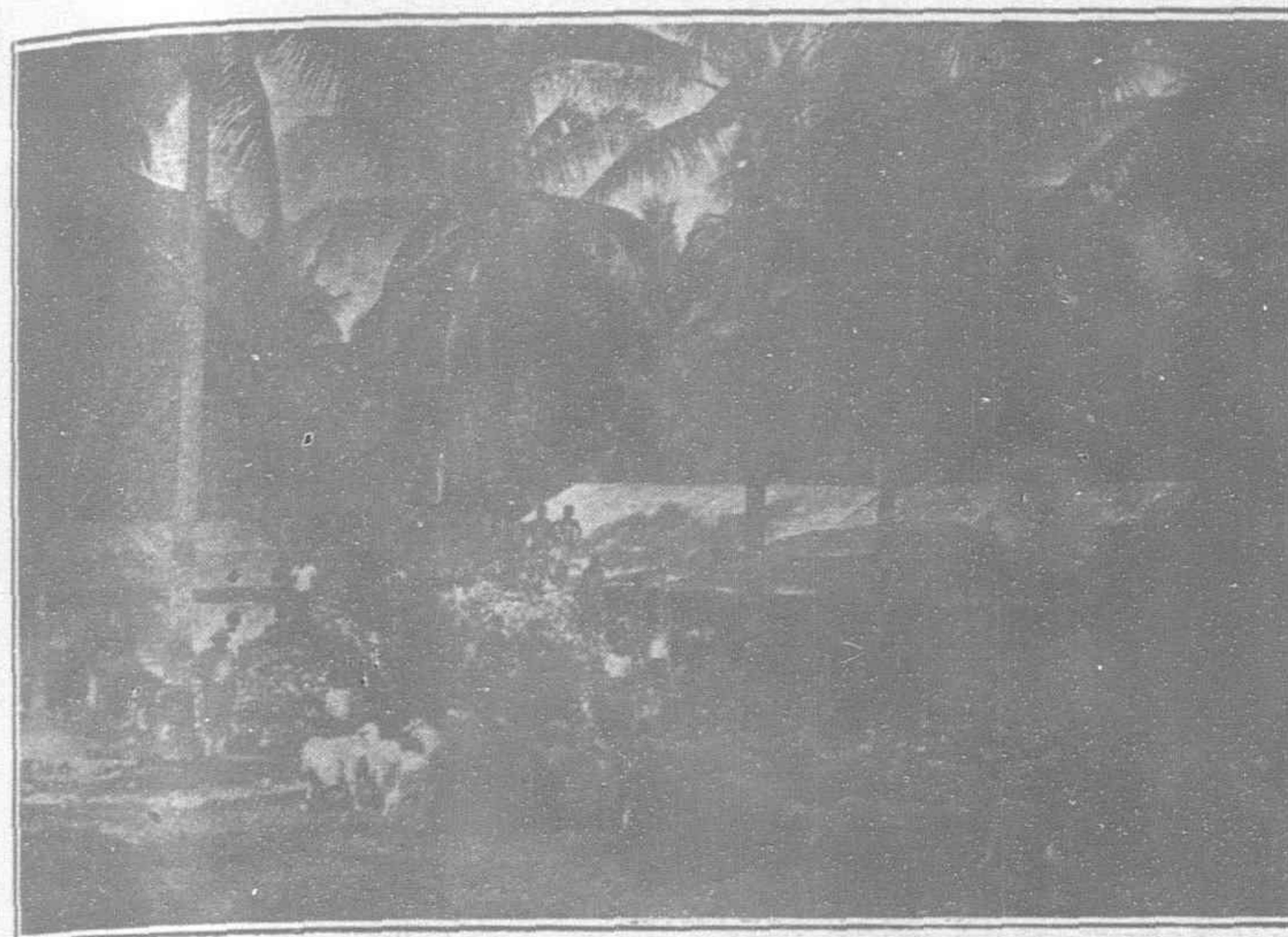
sanitation and laws governing the public health were rigidly enforced. In all centres, plantations, trading and mission stations, even in native villages near the whiteman's settlements, notices were posted up as to the proper means of destroying the mosquito. The Australian soldiers were an army of health inspectors. Each inspector had his Chinese boss-man, and each boss-man his native workers. These workers were especially trained, and were ever busy cleaning roofs and spouting of houses, flushing drains and tanks, sweeping yards and streets, in short taking particular care that water neither lodged nor was exposed in any open way that would help the mosquito. To such a thoroughness were the regulations interpreted



Government Road through Jungle



German Homestead now Appropriated



On a Sheep and Cocoanut Plantation

that the thousands of beautiful shade trees which avenue the fine streets of the German settlements all over the islands were carefully examined for any grooves, or crevices, and these were instantly filled up with cement. The results were wonderful. Malaria, once too common in the group, is in check, and the public health and activities have improved amazingly.

The military administration studied to carry out several of the sensible German ideas of colonization, and as railways could not be built, splendid roads were formed running into every nook and corner of the most populated islands. Gangs of natives keep these roads in excellent repair, some are avenued and shaded for 50 to 60 miles by cocoanut palms, or by other tropical shade trees.

What perhaps is the crowning effort of the Australian military administration is the grand work accomplished in attending to the medical care of the natives. Well equipped hospitals are in all of the islands, and to these the natives are encouraged to come for their ailments. No charge at all is made for attention. Doctors and nurses are constantly traveling through the country to native villages, even to those in which savage natives live. The natives have come to recognize the power of the whiteman-doctor, and the witch-worker or native doctor is now seldom met with. Whole villages consisting of perhaps three to four hundred men, women, and children will walk for days, and many miles to meet the administration doctors when they are on an island.

If the Australian administration never did anything else it deserves to go down to everlasting fame for this wise and humane ministration.

The early days of German New Guinea are interesting and even romantic. Fifty years ago a very remarkable woman, Mrs. Forsayth by name, but popularly known as "Queen Emma," came from Samoa and was the first white trader the natives had ever seen. No title suited this energetic woman better than that of "Queen." She had a commanding personality, was strikingly handsome, with charming manners, a most accomplished woman and gifted with a remarkable business ability.

During her life time in German New Guinea she owned cocoanut plantations larger than a number of British counties. As a trader, and coming into direct touch with the natives over whom she always held quite a magic influence, she acquired acres of rich lands in exchange for sticks of tobacco. To-day her plantations are owned by a company, and the profits are hundreds of pounds sterling a year.

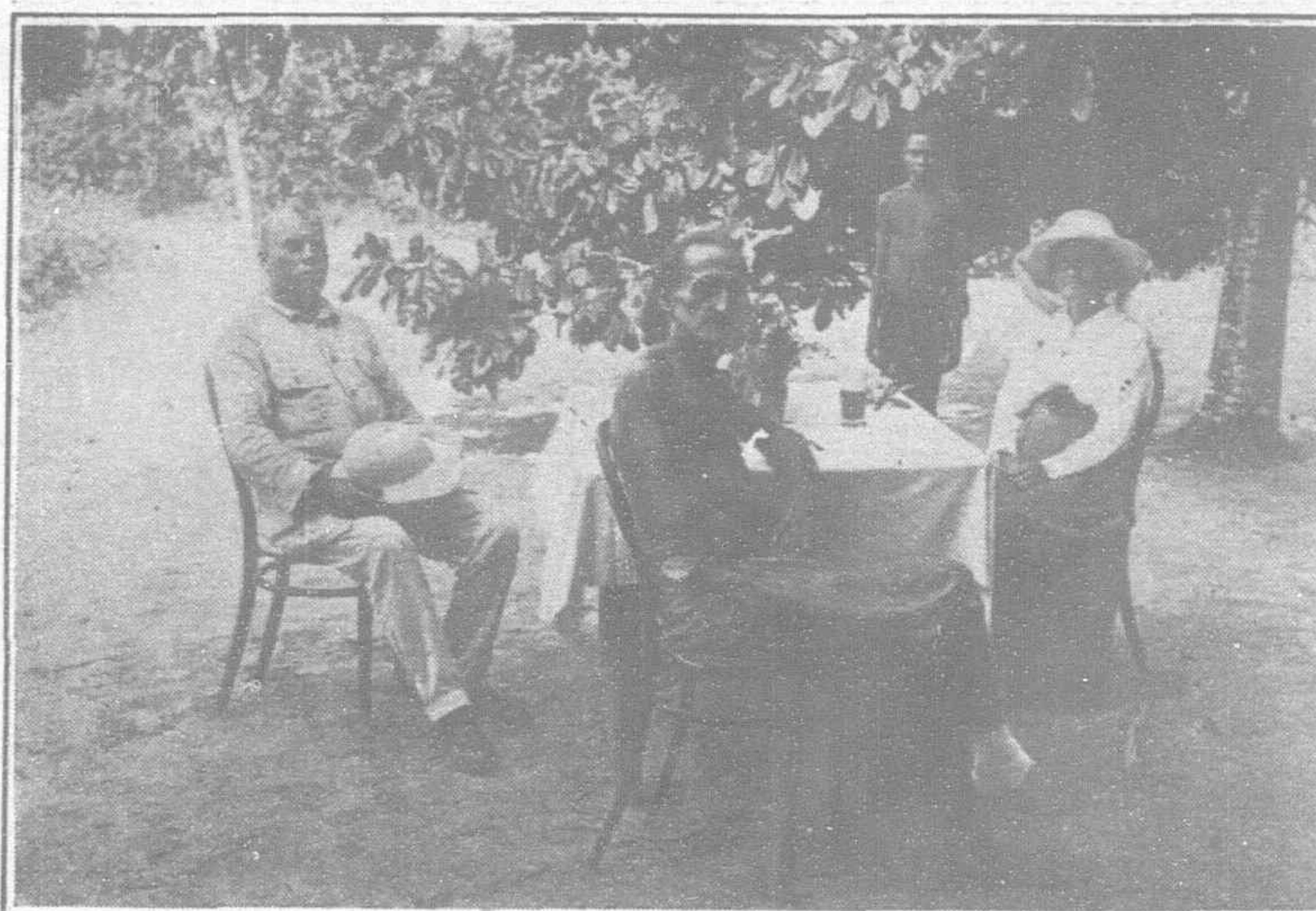
An interesting attempt to establish a French settlement of German New Guinea took place some 40 years ago. A rich French nobleman, the Marquis de Ray, after traveling for twelve months in the islands, conceived the idea of starting a new kingdom, himself as king. The territory chosen was the beautiful island New Ireland so called from its evergreen hills. The marquis returned to France and issued an attractive prospectus which was freely distributed throughout the countries of Europe. In



In the Phosphate Fields of Nauru Island

a short time men and women of all ranks, professions, and trades applied for shares in the New Colony. Several vigneron from Italy charmed by the "prodigious fertility" of the land as the prospectus stated, signed on impatient of any delay that held them back from the stretches of vineyards which their excited minds painted. The settlement was begun on the southeast end of New Ireland, an exposed and utterly unfit area. From the very landing of the people the project was doomed to failure. Skilled management was lacking in every detail of organization. Upon the ever rough sea-swept shores of the island lay piles of building materials, machinery for all kinds of trades and industries, boxes of food, and huge cases of clothing. But then it was found there were no nails for the erection of the houses, the machinery was minus many of its essential parts, the food was badly packed and quickly perished, and the clothing was useless being too heavy in texture and totally unsuited for the hot climate. Worse than all, however, was the fact that while there were wines and spirits in abundance, there were no great quantities of medicines, and none to prevent or check tropical fevers and sicknesses. The settlers were harassed by the natives; malaria became common and some of the leaders died from it. Sickness was followed by despair, and in the end, and but a few weeks after their arrival, all returned to the ship eventually finding a home in Australia. Only one young man elected to take his chances on the island, and that man to-day is a cocoanut planter near Rabaul, and is exceedingly wealthy.

A weird but interesting personage is Herr Auguste Englehardt, the "Apostle of the Cocoanut." An Austrian by birth, and exiled from his country for a political offence, Englehardt settled on the beautiful island of Kabakon. He purchased the whole of the island, and had every acre planted with cocoanuts. He died last year worth £60,000. He was a crank, though a most unaggressive and charming one, with the strange doctrine that the cocoanut was the original, and should be the only, food of man. He taught (and had in many countries of the world disciples, in America 600) that living on the cocoanut freed the mind and the heart of man from all wicked passions. He himself subsisted entirely on the cocoanut made up in various salads, and drank nothing but the cocoanut liquid or milk. He was a very thin but very active man, and his unusual diet did not seem in the least to impair his health. The "Apostle" was a man of much erudition, spoke several languages, and possessed one of the largest and most complete libraries in the southern hemisphere. Firm in the belief of his strange doctrine he never forced his opinion on his guests, and while he ate his meagre fare of cocoanut his guests regaled themselves with the freshest of foods and excellent wines. His house was a commodious bungalow the walls of every room having exquisite views painted on them by an artist brought from Austria. On them were scenes of the Danube and of the German University at which the "Apostle" was educated. While the guests slept on

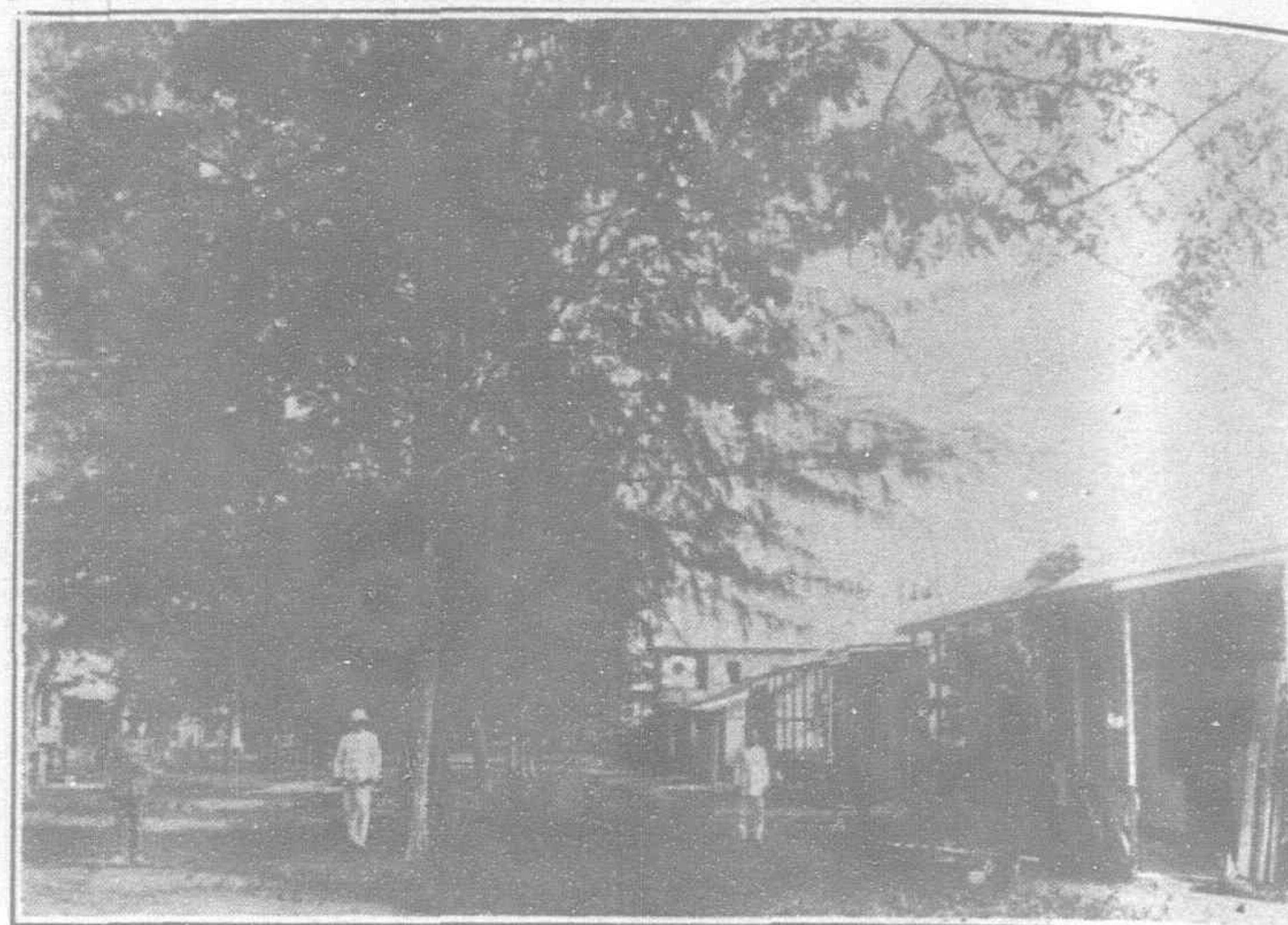


The Author with the "Apostle of the Cocoanut"

the softest of beds, the "Apostle" reposed, and soundly slept, on his bed of sand, which was new spread for him every morning. No better evidence of the thoroughness of German methods of colonization could be given than the settlement city of Rabaul the seat of government, and the capital of German New Guinea. Rabaul is complete with every modern convenience. It is situated an the south end of the island of New Britain, and is one of the deepest, safest, and most picturesque harbors of the South Pacific. The streets of Rabaul are wide, well finished, every one being a cool and delightful avenue of shade from bright, flowering trees. The buildings, public and private, are ornate in the bright colors with which they are painted. They are also artistically designed. At one end of the city is a botanical gardens having every plant, tree and flower belonging to the tropics, and these gardens were laid out and managed by a gardener who came from the Royal Gardens of Berlin.

One section of Rabaul is known as "Chinatown," for here live and work some 700 Chinese. Chinatown is nothing less than a hive of industry, never ceasing night and day, and every day including Sunday. There is nothing German whatsoever about Chinatown. It is a little patch of China, as much as if it was within the walls of Peking. The men, women and children wear Chinese dresses, their trade signs are in Chinese characters, and indeed they carry out Chinese customs just as they would do if in the heart of the great Chinese Republic. There are Chinese tailors who made the Germans white suits, Chinese laundrymen that wash these suits. Every Chinese trade is in full swing, so much so that the streets are crowded at one o'clock in the morning, as they are at one o'clock in the afternoon. The town is lighted by electric light, and at any hour the bang and the twang of Chinese musical instruments can be heard. Chinatown is always full of bustle. Chinese traders are scattered in all the islands of the territory and they get on in a most friendly way with the natives. The German administration did not interfere with Chinese enterprises, and, during it, many Chinese became wealthy, some owning big plantations. Since the Australian administration the Chinese have had their condition improved; where German laws did not protect them and their properties in the past, the Australian laws now give them every freedom, and the Australian court is open to hear and to remedy all their troubles if it can. So far this administration has not put any check upon the entrance of Chinese to the islands, and it is to be hoped that it will not, for the Chinese are useful in many ways, and make excellent boss-man dealing with native labor on a plantation or in a trading store.

Australia has a fine opportunity of showing wise administration in governing the destinies of German New Guinea, and also in promoting the commercial welfare of the territory. Undoubtedly there is a great future for German New Guinea. It had the very best of beginnings in German enterprise, development and general commercial thoroughness. If Australia continues this energetic



Chinatown, Rabaul

policy then German New Guinea cannot fail to be one of the most prosperous of the island groups of the South Pacific. It should become the half-way house of a tremendous trade between Asia, and the commonwealth of Australia. Australia is at present working and hoping for a big trade with China, an instrument to assist this endeavor will be to work up a trade in the products of German New Guinea.

Mr. Bain New Chief of Bureau of Mines

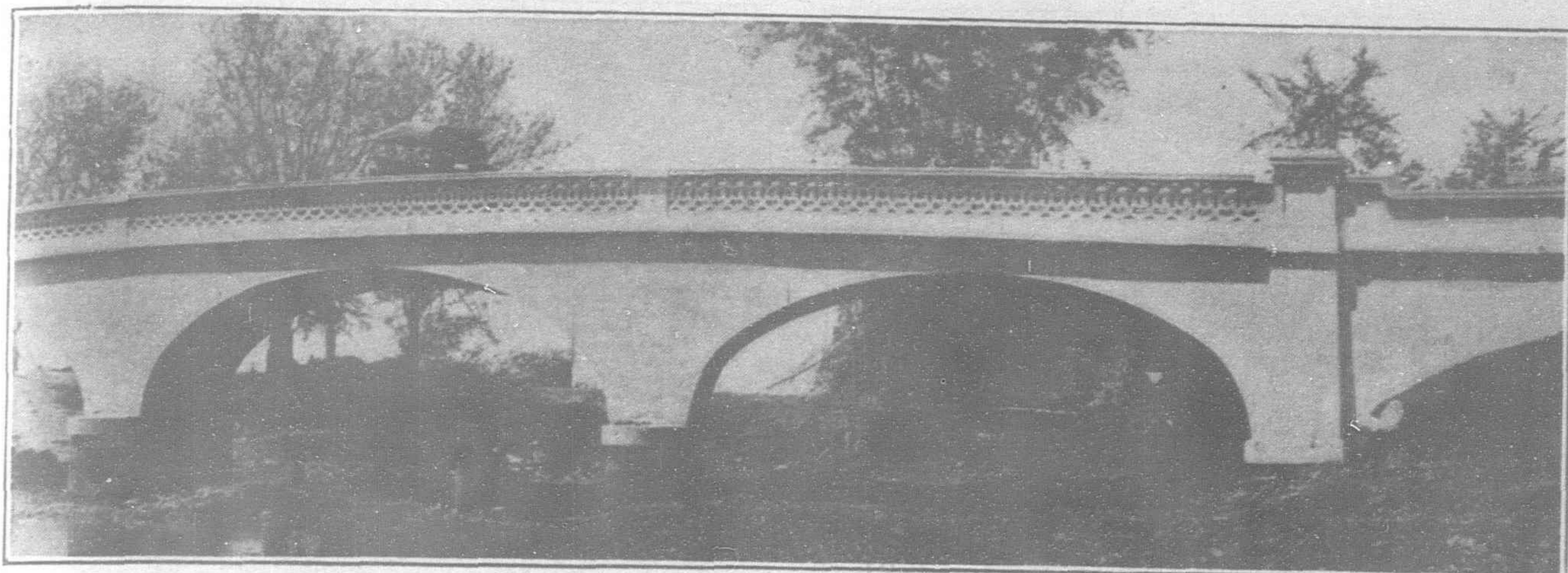
Dr. F. G. Cottrell, director of the United States bureau of mines, who presented his resignation to the President, through Secretary Payne, left the bureau to become chairman of the division of chemistry and chemical technology of the National Research Council. Dr. Cottrell recommended as his successor H. Foster Bain of California, whose name was formally presented to the President. President Wilson later nominated Mr. Bain.

Mr. Bain was educated and trained as a geologist and mining engineer. He was one of Herbert Hoover's assistants in London on the Belgian relief work during the war. In China Mr. Bain has made some extensive surveys and some of his experiences in Yunnan province are especially interesting. At one time he was a mine operator in Colorado and once was connected with the United States geological survey. Subsequently, he was the first director of the geological survey of Illinois.

Mr. Bain was born at Seymour, Indiana. Graduating from Moore's Hill College, Indiana, in 1890, he spent two years at Johns Hopkins University and later received his doctor's degree from the University of Chicago. He has been for many years a prominent and active member of the American institute of mining and metallurgical engineers, the mining and metallurgical society of America, and the American mining congress.



H. Foster Bain

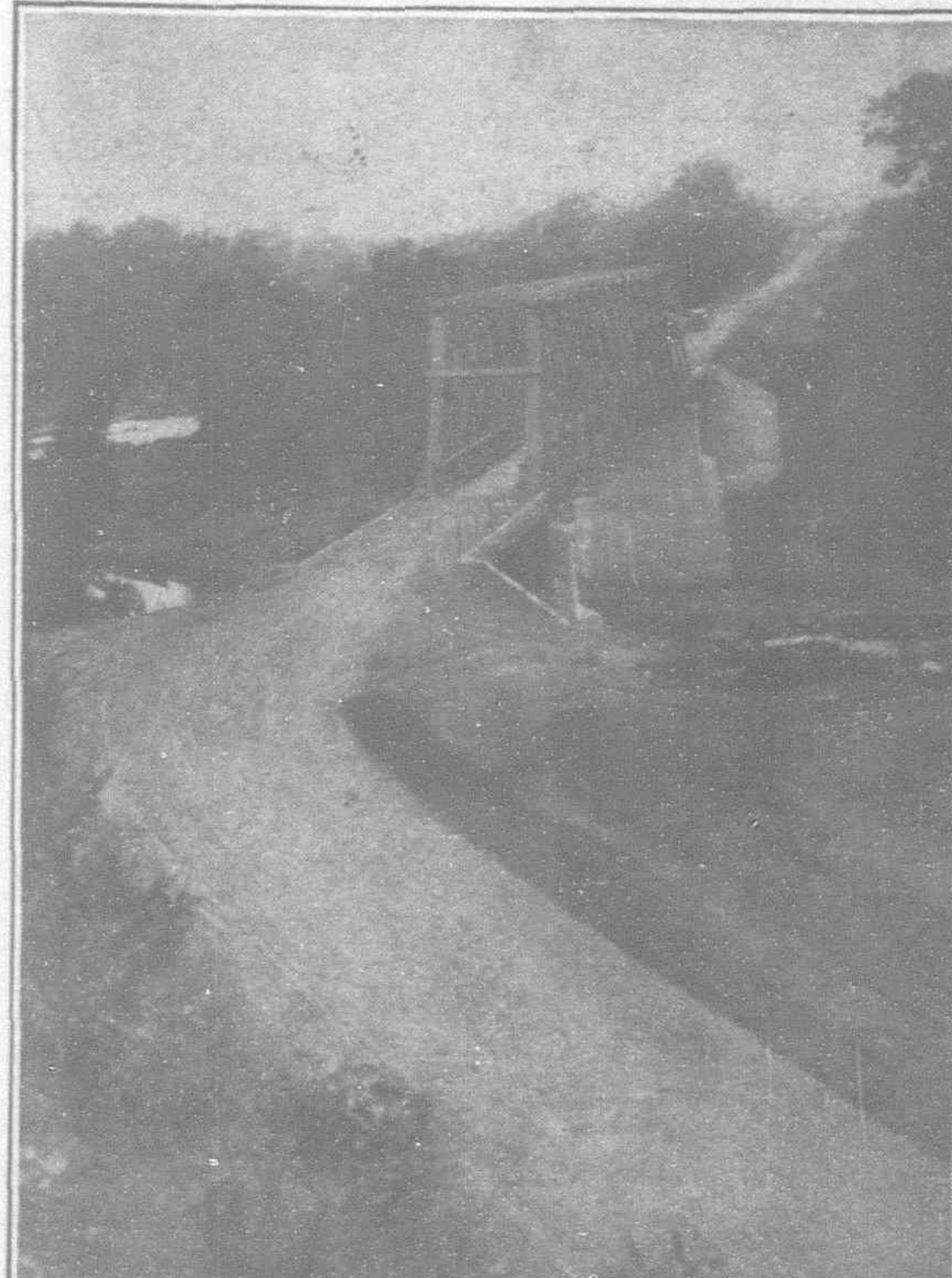


New Concrete Bridge, Philippine Islands

Philippine Public Works

THE much belated report of the governor-general of the Philippine Islands for 1919, has been received. In view of the many criticisms directed against the recent administration of the islands arising largely from the substitution of Americans by Filipinos in the various government departments, the report helps to give a more intelligent insight into what has really been accomplished. Especially is this so in the matter of public works whose force of engineers and trained men were depleted during the war by numbers joining the armed forces of the United States, and it was not until early in 1919 that this situation was partly relieved enabling the bureau to proceed with many important works.

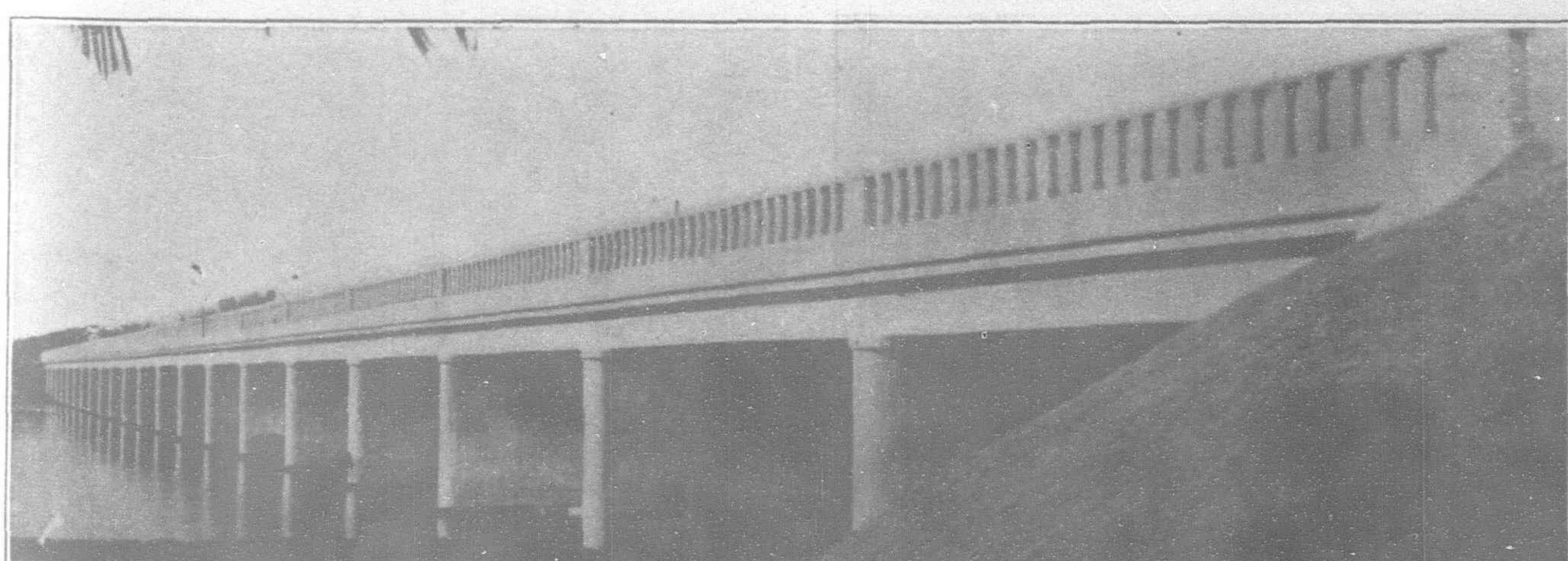
In spite of this fact, however, the number of engineers and architects available during the year was still insufficient and great efforts were required of them in order to execute the whole public works program of 1920.



Bridge and Roadway over Palico River, P.I.

While the technical force was thus depleted, the record established during the year compares favorably with previous years. The kilometrage of roads laid out was greater than those built in any previous year since 1916; the number of buildings finished was greater than the number of those completed in 1918; the preliminary steps for the construction of vast irrigation systems were accomplished with such speed that it was possible to start the construction of many such systems in 1920; and the preparatory work for the construction of Pier No. 7, which will be the largest and most modern pier in the Orient, was also accomplished in spite of its extensiveness and difficulty.

During the year 1919, the bureau supervised the expenditure of the grand sum of P.17,811,289.02, which represents a total expenditure of P.8,966,001.55 for roads and bridges, P.4,792,524.86 for buildings, P.1,608,418.45 for port works, P.1,382,599.11 for water supply, and P.277,737.86 for irrigation projects, and which in



Harrison Bridge, Philippine Islands



Iloilo Custom House



Cebu Custom House

turn represent an increase of 23.5, 77, 42.4, 20.6, and 130.9 per cent., respectively, over the corresponding 1918 figures.

The big expenditures set forth above had for big results 410.1 kilometers of first-class roads, 46 reinforced concrete bridges and culverts, 163 deep artesian wells, and 37 reinforced concrete buildings of over 100 cubic meters of capacity.

Roads and Bridges

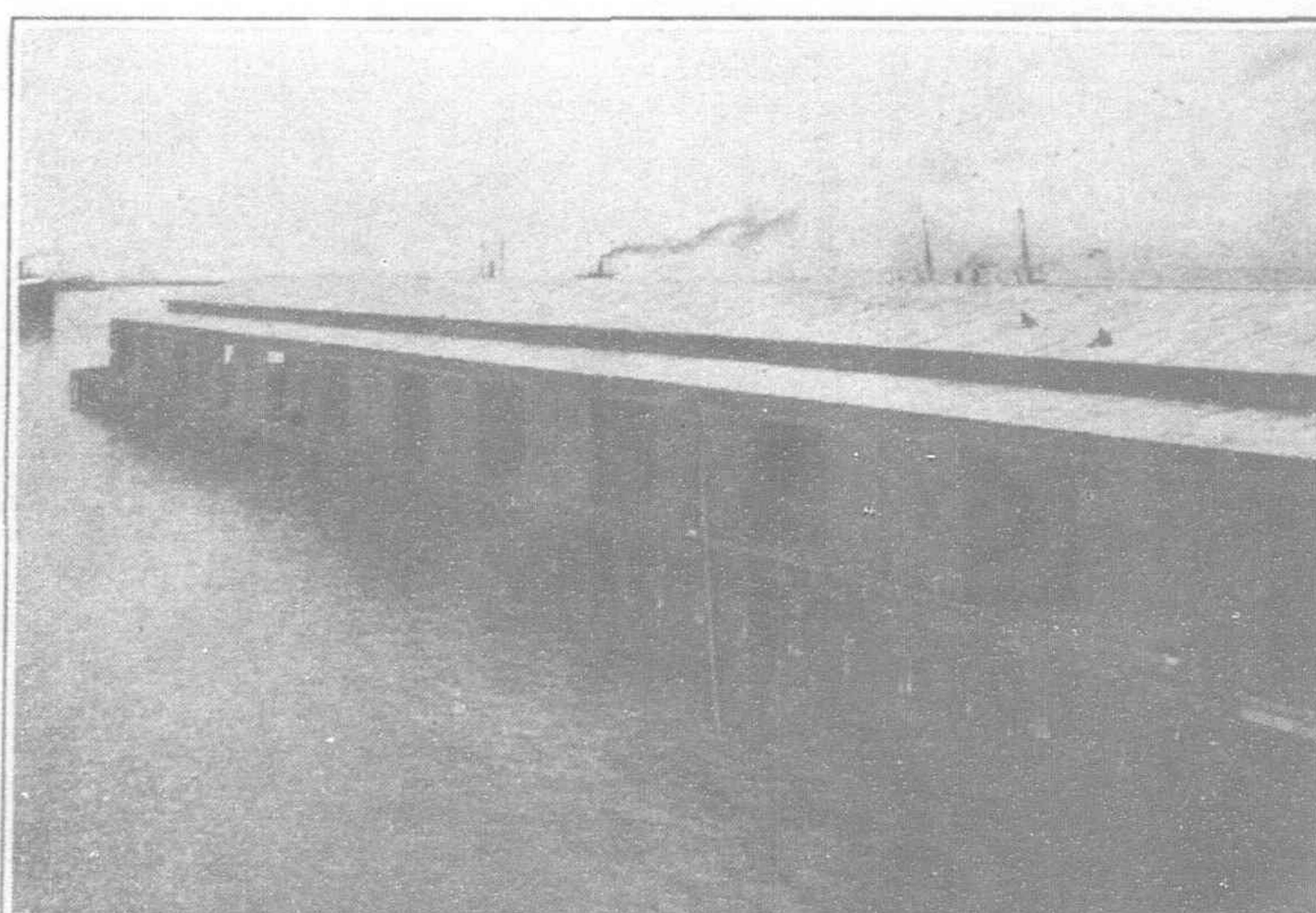
The policy of nationalizing the roads, of making them a connected whole through intercoastal and interprovincial roads, and of making road construction dependent on the transportation requirements and financial ability of each province was continued.

At the close of business on December 31, 1919, there were in existence 4,500.3 kilometers of first-class roads, 1,986 kilometers of second-class roads, and 3,109.2 kilometers of third-class roads as against 4,090.2 first-class roads, 2,015.8 second-class roads, and 3,128.7 third-class roads in existence during the previous year, or an increase of 410.1 kilometers of first-class roads and a decrease of 29.8 kilometers and 19.5 kilometers in second and third-class roads, respectively.

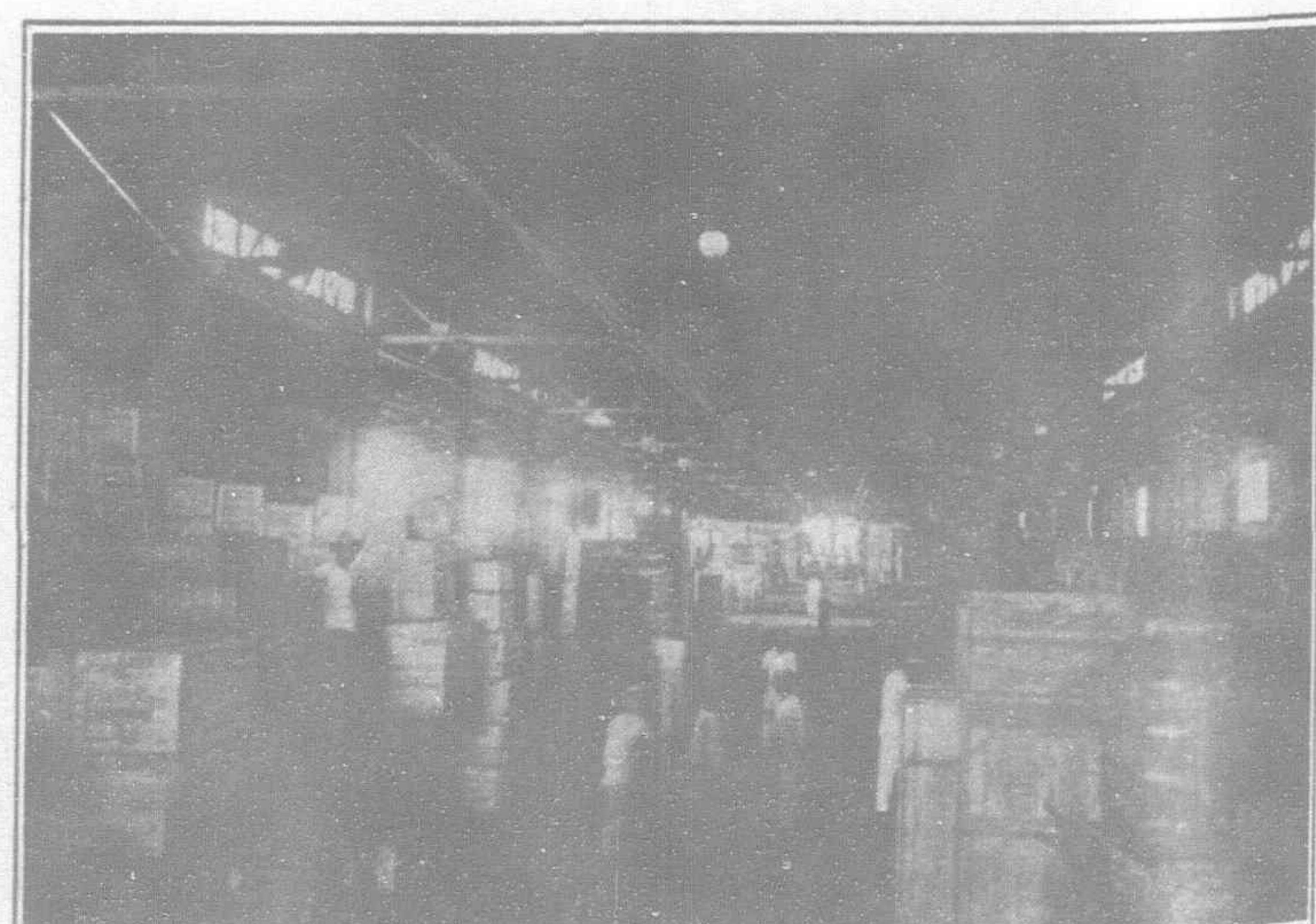
Besides the progress made in increasing the kilometrage of first-class roads and decreasing that of the two other classes of roads, notable advance was also attained in the extent of road surfacing and road maintenance. The figures at hand show that in 1919, 1,452.9 kilometers of road were surfaced with stone, 3,067 with gravel, 1,247.2 with coral, while 3,828.4 kilometers were unsurfaced; whereas in 1918 only 1,380.7 kilometers were surfaced with stone, 2,838 with gravel, and 1,127.6 with coral, while as

much as 3,888.4 kilometers were unsurfaced. As to road maintenance, the figures show that while the kilometrage increased during the year by 3,608, the kilometrage not maintained in 1919 either by the caminero system or the gang system amounted to 1,998.8 kilometers only as against 2,437.8 kilometers in 1918.

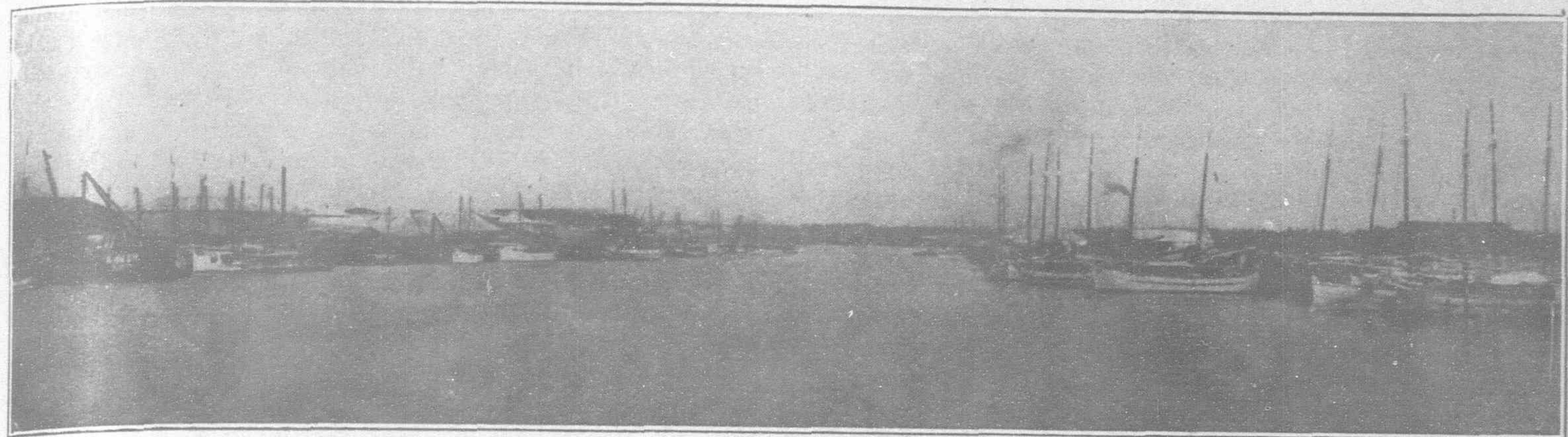
The cost of maintenance in 1919 was P.3,919,560, of which the insular government paid P.810,915. There were 7,310 motor vehicles registered in the islands, a gain of 2,103 over 1918. These are almost entirely of American manufacture. The sum total is increasing very rapidly in 1920, and in addition to the numbers of motor busses, motor tractors are being rapidly introduced. The first-class roads were not originally constructed to support a traffic of this nature, and the question is now frankly mooted whether the McAdam type of road has not entirely outlived its usefulness. The bureau hopes to introduce the surfacing of asphalt or concrete, the difficulty with the latter being the price at which cement is obtained, from Japan P.12 to P.14 a barrel. Plans are under consideration by the government for the erection in the islands of a modern cement factory. If the initial cost of a new type of road surface comes within reason, its adoption will be a capital investment for the government in the saving of maintenance charges. A clear example of the inadequacy of McAdam roadways was the condition of the Manila city streets at the end of 1919. Visitors inclined to be critical could justly complain of the street surfaces, perhaps not taking into account that motor vehicles has increased by one-third during the year, and that for weeks several of the principal streets in August and September were flooded, washed out, and cut to pieces by the passage of heavy vehicles at that time. Add to that the practical impossibility of securing



Port Works, Steel Wharves from Harbor, Manila City



Interior of Pier No. 5, Manila City



Iloilo River and Wharf

good stone for crushing anywhere near Manila, and the engineering difficulties will be better appreciated. An insular bond issue for new road construction may become necessary, but so large a share of the budget is usually appropriated for road construction and repair that given reasonably cheap cement, a concrete road might be built out of income from, say, Los Baños to Quingwa as a beginning. The city of Manila has meanwhile made the usual superficial repairs to damaged streets, and has been authorized to issue bonds for permanent roadways.

As to bridges, in spite of the high cost of materials and labor, several were constructed, as may be seen from the figures given above. The most important were the Buendia Bridge, Calero (now Soriano) Bridge, Parañaque Bridge, San Matias River Bridge, Marusay River Bridge, Catablan River Bridge, Sabang River Bridge, Inabanga River Bridge, and the Miagao River Bridge.

Port Works

What was said in the reports for 1917 and 1918 about the need of supplementing the network of beautiful roads with docking facilities, of increasing port construction equipment, and of adopting a more ambitious port program for the Philippines with a view to enabling her to reap her full share of the world's commerce may be reiterated. It is gratifying to know that the legislature has at last realized the need of adequate marine terminal facilities and

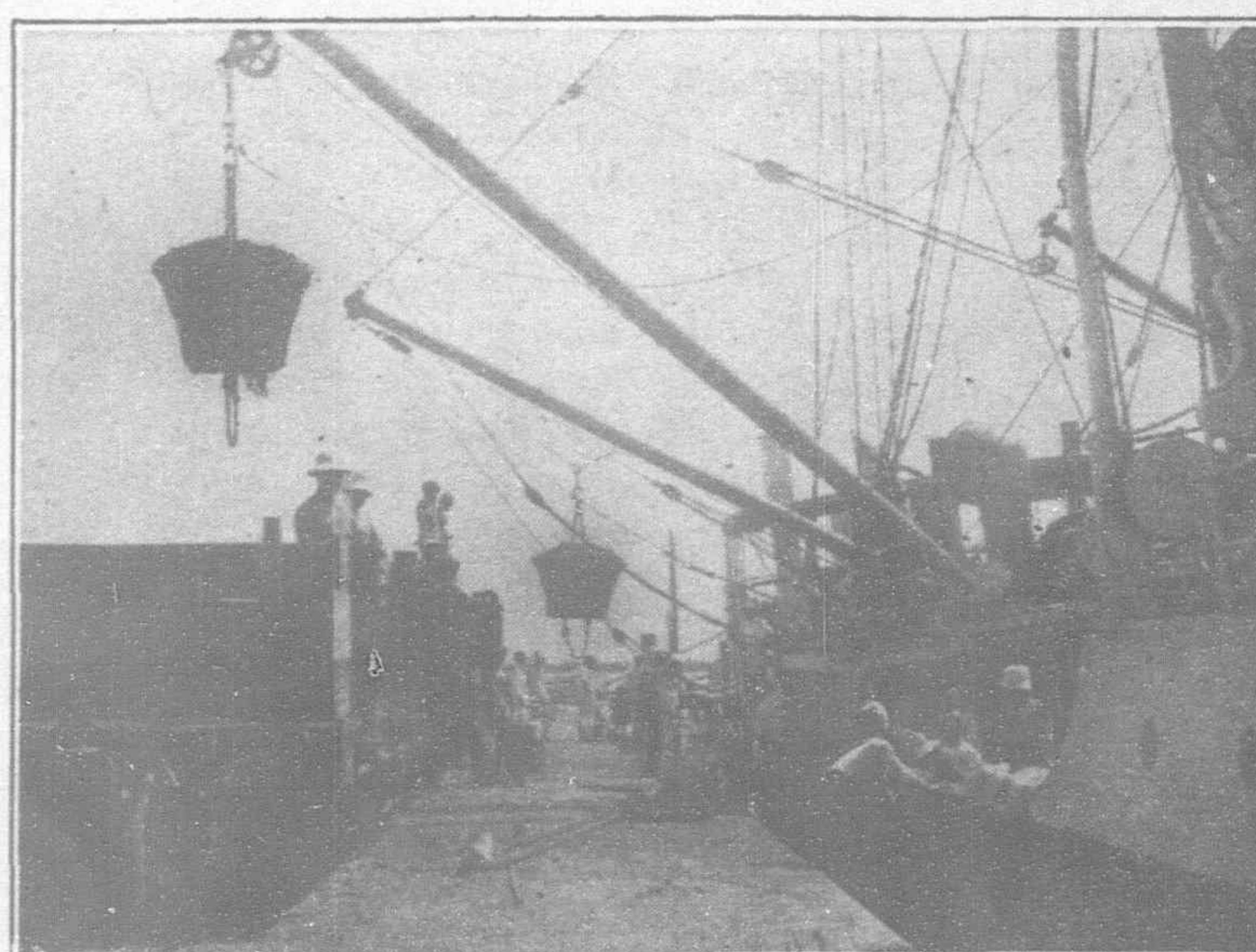
authorized the issuance of bonds for the purpose of raising P.12,000,000 for the construction of port improvements all over the islands.

Conscious of the need for port facilities, the bureau of public works made several studies and investigations of possible port improvements all over the islands and began the construction of various projects. Plans for an intensive improvement of the port

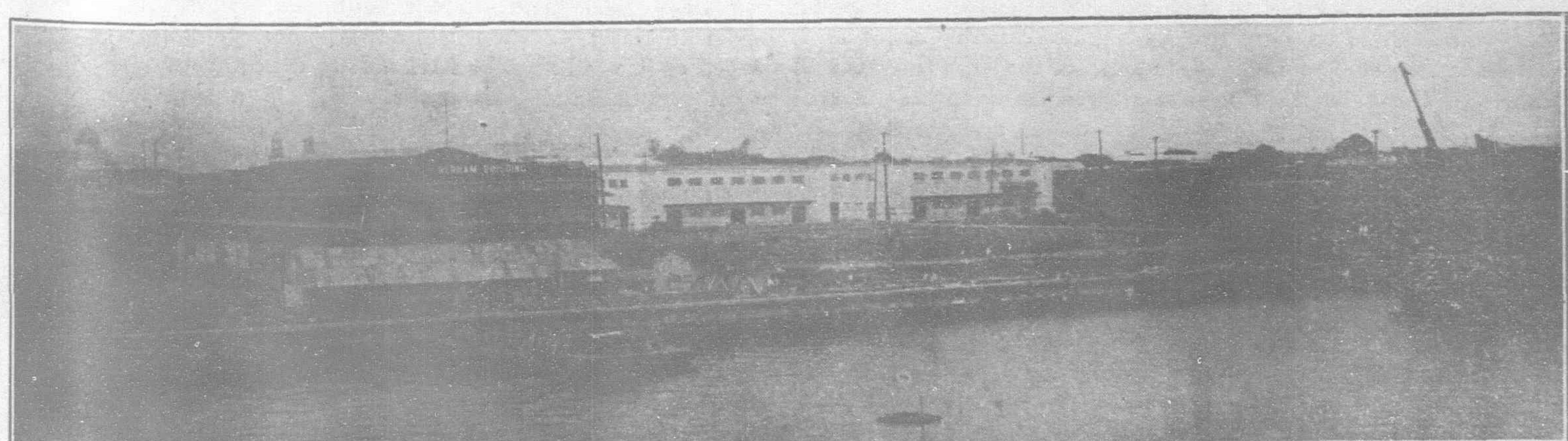
facilities at Manila to cost P.40,000,000 were completed. Pier sheds were built between Piers 3 and 5; surveys of all Manila estero, river, and harbor lines were begun; and the preparatory work for the construction of Pier No. 7 was accomplished. This Pier 7 will cost P.3,750,000 and, when completed, will be the grandest in the Orient and the equal of the best in the world. It will be equipped with such modern cargo-handling equipment as will enable ships to clear within one-third or one-half of the time usually required for the purpose. It will have a comfortable passenger waiting room, an adequate baggage room, and a suitable space for the use of customs officials. It will also have an overhead pas-

senger passage which will enable passengers to get to the ship or to the waiting room without going down to the dangerous area below where cargo is loaded and unloaded.

In the provinces much was also accomplished along this line. In Lanao a 430-foot-long wharf was completed and in Iligan, same province, the proposed revetment was started. In Davao the



Discharging Coal from Steamer into Railway Cars along the Concrete Sea Wall at Cebu



Manila Harbor, Bulkhead from the Bay

L-type wharf was nearing completion. In Zamboanga a 160-meter sea wall was being built for the Zamboanga Dock. In Sulu the materials for the Jolo wharf were requisitioned, and the construction of the Siasi wharves and the Cagayan de Sulu docks was continued. In Iloilo the construction of the Iloilo River wall was also continued and dredging was carried on in the lower part of the river channel. In Capiz the hydrographic survey of the port of Libas was finished and the plan submitted for design. In Cebu the reclamation of the area inside of the new dock was continued with success. In Calbayog, Samar, the river wall was 92 per cent. finished. In Dumaguete, Oriental Negros, the construction of the causeway and temporary platforms was begun. In Romblon, the topographic survey of the Romblon wharf site was completed. In Palawan the construction of the Coron Dock was continued. In Sorsogon the sea wall was about 50 per cent. complete. In Tayabas the materials for the Boac Pier, which will cost P.15,000, were requisitioned. And in Cagayan several canals were dredged and cleared.

As to dredging, it may be said that due to the lack of equipment, it was not possible for the bureau to comply with every request for dredging, having reclamation and harbor improvements in view. But efforts were made to accomplish as much as possible with the available equipment at hand, with the result that the dredging operations during the year registered 1,124,976.50 cubic meters of materials dredged.

Port and River Development

Chinwangtao Activities

THE net value of the trade of the port of Chinwangtao for 1920 was Hk. Tls. 17,180,516, an advance of Hk. Tls. 1,480,076 over the figures for 1919. The famine, happily, has not visited this district, though the drought during the first six months of the year reduced the crops by about one-third and also affected their quality. Coal shows a steady increase, and its value—Hk. Tls. 10,413,239—contributed 60.6 per cent. of the whole trade of the year. The present output of the Kailan Mining Administration is 14,500 tons of coal a day, and during the year amounted to four million tons. The labor employed consists of 15,000 men on underground and 7,000 on surface work. 3,000 coolies are continuously employed in steamer loading and are capable of loading as much as 12,000 tons a day of 24 hours. The present known deposits of coal, to a depth of 3,000 feet, is estimated at 1,000,000,000 tons, while the aggregate length of underground tramways for the haulage of coal is 300 miles. Other products of the company consist of firebricks, fireclay, clinker bricks, glazed tiles, and stoneware piping. The production of anthracite coal at the Liukiang mine is progressing, and the grade known as "special nuts," which is said to compare very favorably with Cardiff coal, is all being exported to England, in spite of the high freights still ruling. In the vicinity of Liukiang three more anthracite coal mines are now working under foreign methods, and there is talk of one of them coming under foreign ownership in the near future. Coal yards have been extended and new railway sidings laid down, while the main railway tracks to the breakwater are being improved by replacing the old 60-lb. rails with heavy 80-lb. rails. Dredging of the harbor has been maintained, and a new grab dredger, in course of construction, will probably start work in the coming spring. The development of Hulutao will not affect the export trade of this port, but imports for the Manchurian marts and inland places along the railway line will probably be affected. Again the opening of the projected ice-free port at Tatsinghokow, some 40 miles down the coast and in close proximity to the

Kailan mines, will probably divert part of the coal traffic from this port, as it is estimated that coal sent in that direction will make a saving of 30 cents per ton. Chinwangtao, however, is destined to become an important industrial centre, and if the contemplated construction of the road, linking this place with Tungchow, near Peking, materialises, it cannot but add importance to this port.

Chihli River Improvement

It was mentioned in the 1919 trade report that the arrangement of intermittent grants to the conservancy board was very unsatisfactory, and a hope was expressed that the position in this respect would be stabilised. It is therefore satisfactory to mention that the financial position of the commission has been considerably improved by the guarantee of a monthly grant of Tls. 30,000, which is sufficient to cover its ordinary recurring expenditure. The arrangement took effect from May, when, with the consent of the diplomatic body, the commission made a loan (repayable by monthly instalments of \$100,000 from April 1921) to the Chinese government of \$1,000,000 out of certain allocated funds which were lying idle pending the sanction of various definite schemes of improvement. Survey work was to some extent hampered by the local disturbances of the summer, as survey parties had to be recalled from the field early in July and were unable to recommence work till the beginning of September. The year was also disappointing as regards the collection of hydrometric data, the rivers throughout the year being extremely low owing to the very scanty rainfall. The surveys of the rivers to the northward of Tientsin were, however, completed, and a topographic survey of the country lying between the Yungtingho and Peiho was approaching completion. Towards the south, river surveys of the Weiho, Tangho, Shaho and Tzeho were completed, in addition to topographical surveys of several localities. The total area surveyed during the year amounted to 11,419 square kilometres. As regards the actual construction of works, two schemes of a flood-protective nature were put in hand, viz., the outer Tientsin south dike and the Machang canal escape channel. In the former case the construction and cost of the earthwork was undertaken by a syndicate of local gentry, the commission on its part being responsible for the necessary masonry works. The railway embankment, which can be made to serve as an effective dike in continuation of the new portion of dike now constructed, still requires to have its formation level heightened, and negotiations to effect this are in hand with the railway authorities. The new outlet channel for the Machang canal was commenced in October, and about 75 per cent. of the total earthwork was completed before winter set in. The remainder of the earthwork and the construction of head sluices will be put in hand in the spring. The reversion of the Peiho still hangs fire. Mr. F. C. Rose submitted, in September, proposals worked out in detail, in which the reversion was estimated to cost, approximately, \$5,000,000. There is, however, considerable local opposition to the scheme, and it appears unlikely that sufficient funds to finance it will be forthcoming, even if the opposition were overcome. It is for consideration whether it would not be advisable to concentrate on the diversion of the Yungtingho, a river which is a real menace to the country and to the port of Tientsin in particular. The reversion of the Peiho cannot remove the danger of the Yungtingho: the most it can do is to bring matters where they were before the Peiho diverted itself into the Chienkanho. The successful diversion of the Yungtingho by means of a separate outlet to the sea would, on the other hand, remove the menace of the port being rendered inefficient by heavy silt deposits. The commission hope to be able to formulate definite proposals during the summer of 1921; and if these find general approval, energetic action should be taken to procure an allotment of funds sufficient to carry out the work within a reasonable period.—*Reports from the Chinese Maritime Customs.*

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Telegraphic Address: Farview, Shanghai

SHANGHAI, JUNE, 1921.

At a dinner tendered to Mr. Thomas W. Lamont at the Tokyo Bankers' Club on May 11, 1920, he stated in his address that before his departure from America for the Far East he and Ambassador Morris had received assurances from the Japanese banking group and leading members of the cabinet that Japan would withdraw her reservation regarding Manchuria and Mongolia. In the reports of this speech published in American newspapers, this assurance was mentioned as being the direct cause of his visit to Tokyo in order to conclude upon the ground the long drawn out negotiations. In our Special Consortium Supplement, we gave the credit for this entirely to Mr. Junnosuke Inouye, the governor of the Bank of Japan, and recognized leader of the Japanese banking interests, stating that he personally had telegraphed to Mr. Lamont that Japan would enter the consortium. As a matter of fact, Mr. Inouye never came in contact with Mr. Lamont before his visit to Japan, either personally or in correspondence, so the assurance received by Mr. Lamont that Japan would enter the consortium came through other channels.

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THEN WHY HARASS JAPAN?

No consortium group may prevent a loan by other groups or even by one group willing to make it by themselves or alone.

THE consortium agreement contemplates that no one of its groups and no combination of its groups less than all, will make long term loans to China or to a Chinese province on bonds to be sold in foreign countries, without first giving all the other consortium banks an opportunity to participate in the loan in the equal proportions provided for in the consortium agreement. This is obviously necessary to any plan which provides for international banking co-operation in loans to China in the place of international banking competition. On the other hand, if any one or more of the groups should not desire to participate in a proposed loan, and one or more should be willing to make it, there is nothing in the consortium agreement to hinder. In other words, no consortium group may prevent a loan by other groups or even by one group willing to make it by themselves or alone."

This explanation of the consortium agreement was given by Mr. Frederick W. Stevens, the representative of the American group, in a talk before the American chamber of commerce at Tientsin on April 22.

It is only necessary to recall that Japan was willing to pool her Taonan-Jehol project in the consortium, but requested as a special consideration based on strategical reasons, that this line be speedily financed, and, if the other groups were unwilling to participate, she be permitted to undertake the task single-handed. The consortium tempest simmered down to this one question. Now Mr. Thomas W. Lamont,

the head of the consortium, told us in an official history of the negotiations published over his signature in the American papers of August 8, 1920, that the opposition to Japan's request for reserving Manchuria and Mongolia from the scope of the consortium was not because the western groups had any particular plans for developing the provinces in question, nor were they specially desirous of making investments there, but because they could not assent to being excluded from those regions.

The question arises, if Japan desires to proceed with the construction of the Taonan-Jehol line on the grounds that it is essential to her economic and strategic safety, will she be permitted to tackle the job single-handed, or will the other members of the consortium take up their participation, and accept the implied responsibility of preserving the neutrality of the Inner Mongolian strip menaced by an invasion from the direction of Urga? If Japan is willing to undertake the work single-handed and there is nothing in the consortium agreement to hinder (if the others decline to participate), then it simply remains for her to notify the other groups that she is prepared to proceed with the construction of the Taonan-Jehol line and invite them to participate. If they decline, there is nothing in the consortium agreement that will hinder her from going it alone.

Japan has been inviting Americans to co-operate with her in the development of Manchuria, and as evidence of good faith has purchased \$75,000,000 of American materials for her enterprises in that region, and is now at this moment spending \$20,000,000 in America and planning to spend \$200,000,000 in the next four years. The South Manchuria Railway is to be double tracked from Mukden to Changchun, the lines from Kirin to the sea, from Chenchiatun to Taonan, and from Taonan to Changchun completed, and many industries expanded and created. Japan says in effect to America, "come and co-operate with me in developing these territories. If you believe that I am bent on aggression in China, the partnership so formed is the best assurance to China and the world, that our activities will be along purely legitimate lines." If Americans refuse to take Japan at her word, and she is at liberty to tackle the job single handed, it seems childish and futile to continue to place obstacles in her path.

* * *

China's Own Railway Program

IN another article we invited attention to the stimulus given to the establishment of new Chinese banking institutions through the disinclination of the consortium to advance funds to the Peking government. From its conception, the consortium has declined to consider the railway problems of China from China's own viewpoint, and as a result, China has set herself firmly against any scheme of internationalization and seems determined to oppose the settlement of any outstanding question which fails to unqualifiedly recognize her full sovereign rights.

There are undoubtedly many ways whereby China can escape doing business with the consortium in the construction of new railways, and circumvent the monopoly of foreign government support to national banking groups. It is not necessary for China to continue to adhere to her old program of nationalizing all railways under the direct control or supervision of the ministry of communications. She can throw the field open and permit Chinese companies or the provinces and municipalities to raise capital for these enterprises, an operation facilitated by the creation of many new banks, whose guarantee, in some cases, is sufficient security for foreigners to lend money upon. As the consortium is not a monopoly and the field being open for the financing of these so-called industrial enterprises, there are many ways whereby the guarantee of the government can be extended to them, without coming in conflict with the aims of the consortium.

Signs are not wanting that the ministry of communications and its advisers have been burning the midnight oil devising plans for the building of railways without calling upon the consortium,

and has drawn up a construction program which foreigners will do well to study. The salient features provide, that :

A. Construction of branches or feeders to existing trunk lines will be open to private enterprise on the following conditions : (1) work must be completed within the contract or specified time ; (2) branch lines exceeding a certain mileage can remain under the management of private constructors subject to the regulations governing the operations of private railways ; (3) short branches or feeders so constructed will be leased and operated on behalf of private companies by the management of the trunk line which it feeds ; (4) favorable operating contracts covering freight and passenger tariffs, etc., will be entered into between the government and private companies.

B. These private enterprises will be encouraged by : (1) subsidies ; (2) reduction of exemption from freight charges for transporting supplies on government lines for a period of years ; (3) rewards to large investors ; (4) guarantee of interest.

C. The public will be invited to subscribe to shares in the existing trunk lines to the extent of 20 per cent. of their capitalization, and interest on the investment will be guaranteed at the same rate as the Peking-Hankow Redemption Loan Bonds (five per cent.). If the above measures cannot be carried out some other plan will be adopted.

D. Building railways by construction companies will be encouraged under the following conditions : Railways will be built under a lump sum contract for a complete section or on an item cost basis. The contractors will not be allowed to interfere in the management of the railways so built, and must hand over to the government each section as completed within the time limit specified in the contract ; the cost of the work to be paid for in annual installments commencing with the sixth year after the date of completion.

E. Bonds for construction will be issued either by existing lines or projected lines and sold through Chinese or foreign banks on substantial securities guaranteed by the surplus revenues of existing railways.

In other words, the minister of communications will attempt to put into practice for the benefit of China certain ideas advanced by foreign bankers as an irreducible minimum for future loan terms. When the above program is studied in connection with the article on the Chinese Banking Group, the facts disclosed must give pause for serious thought. It becomes clearer every day that Peking intends to do everything possible to encourage native investors to come to the rescue of the country. That the Chinese government is now willing to admit domestic investors into a twenty per cent. participation in the capital and earnings of existing lines, in order to obtain the funds to carry out its program, indicates that a strong inducement will be held out to the moneyed interests of the country to come forward and finance its industrial development. If millionaire tuchuns and other officials into whose coffers have poured the wealth of the nation for the past eight years, can be induced to invest it in building profitable railways, instead of buying property in treaty ports and shares in foreign companies and enterprises, China may be able to develop her transportation system without foreign assistance. There is reason to believe that this invitation to invest in patriotic enterprises comes as a direct answer to the campaign waged for over a year to coax native capital into sino-foreign enterprises free from foreign taxation, and, by reason of their nationality, exempt also from Chinese taxes.

The last report of the ministry of communications shows that the valuation of the combined railway properties under its direct control, is \$511,000,000, in which the government equity is \$174,000,000, and the non-government or foreign equity, \$336,000,000 (silver). It has been very emphatically impressed upon the Chinese that in order to obtain a large foreign loan for railway construction at a reasonable rate of interest, it may be necessary to give some additional inducement to the bond purchaser in the way of participation in the profits of the lines, or an inducement equivalent to that conceded to the Siems, Carey Company, or, twenty per cent.

With the ruling rates of interest prevailing in America and Europe, it is no wonder that in their present desperate financial situation, the Chinese authorities are willing to concede their own people a twenty per cent. participation in the capital and profits of their railways in order to raise the funds to proceed with construction. Such participation, if based upon the full valuation of the railways in operation, say \$500,000,000, would amount to \$125,000,000. As long as these bonds are sold in the country, there seems to be no good reason why the foreign banks who furnished the original capital should object, especially as many of these railway loans are secured, not on the physical property and earnings of the lines, but by specific provincial and other revenues. With flotation profits to native banks, and a low price, such an issue or series of issues, should net the railway department the comfortable sum of \$100,000,000 with which to carry out its program. The native investor is guaranteed a five per cent. interest on his money, with the possibility of earning as high as 15 per cent. The surplus of all the government railways for the last official year was \$36,000,000, so it would seem that the investor would be amply secured as to his five per cent. guarantee, even if tuchuns and war-lords do occasionally bang their fist on the table of the railway minister and command him to "fork over" the cash in the till.*

It is perhaps too early to hazard an opinion on the future of the plan. On its face, it was designed to foil the consortium, and in the matter of using the surplus profits of the existing lines as a fund to guarantee future construction loan issues by Chinese companies, financed by Chinese banks, it deprives the consortium of a valuable asset declared by at least one of the official groups to be indispensable to the carrying out of any comprehensive railway plan involving foreign loans. With twenty per cent. participation in the profits of these lines, a fair rate of interest, a low enough issue price, coupled with the profits from construction and the supply of materials, there is every inducement for the new Chinese banks in their heyday of prosperity, to demonstrate their patriotism and business usefulness. The large profits held out to any Chinese construction company that will finance and build a short branch or feeder, should prove attractive to the merchants of cities and towns adjacent to the main lines, and divert the expected flow of Chinese capital into tax-empted foreign enterprises to purely national undertakings. Here the tables are turned, and Chinese companies operating under a guarantee of their own government, offering great profits with the extra inducement of furnishing the materials may attract foreign capital to subscribe to sufficient shares in these concerns to ensure their success.

The inducement held out to foreign firms to purchase shares in these Chinese construction companies in return for an assurance that the materials will be purchased through their agency, may prove too seductive to ignore in these days of strenuous international competition. If the plan works, and the Chinese banks get behind their construction companies, the foreign firm may either have to participate or face the possibility of seeing orders for materials placed over his head in Europe and America by Chinese purchasing agents, as has already occurred in several choice contracts.

Conditions are changing in China. The Chinese banks have outgrown their old pawn-broking days and many are now in a most prosperous condition. There is immense wealth in the country. If the tuchuns and officials can be induced to combine their hoardings with the merchants, to finance these immensely profitable undertakings, there will come a revolution in the ways of doing business in this country.

There may be other ways than through the consortium for foreign manufacturers to sell railway materials to the Chinese. At any rate, if the astute Mr. Yeh's plan succeeds, and his successor obtains the full confidence of the native banks and the moneyed tuchuns, there will have to be something beside pure altruism as a talking point in obtaining the much advertised railway supply business in China. The plan holds possibilities that should make the foreign banker, machinery manufacturer and agent do some tall thinking.

*See Editorial on China's Railway Finances.

China's Railway Finances

THE statistics of the Chinese government railways for the year ending December 31, 1919, showed a surplus of \$36,478,281 after all net income debits had been paid. The Chinese government bureau of economic information, which seems to be the official mouthpiece for the dissemination of this and other interesting information, reports that for the year 1920, the "Free Surplus" (obtained, according to the bureau, after deducting the amounts appropriated for additions and improvements, retirement of funded debt, bondholder's share of profits, etc., from the net surplus of the various lines) was \$19,324,765. After the above explanation it goes on to show how this "Free Surplus" is expended, and gives the following itemization:—

Item	Free (or available) Disbursement	Surplus
Free Surplus ... ... ... ...	... ...	19,324,765
Remittances to Government:—		
Payments of Principal and Interest of Railway		
Loans	3,000,000	
Payments of Railway Engineering Works ...	2,300,000	
Payments of Principal of Domestic and Foreign		
Loans	12,600,000	
Payments of Interest of Domestic and Foreign		
Loans	2,700,000	
To cover Losses of Peking notes collected at the		
four stations in Fengtien	420,000	
Expenses of Tongshan Railway College ...	90,000	
Transfer of Rentals of Postal Cars ...	200,000	
Transfer of Through Traffic Accounts ...	270,000	
	21,580,000	
	2,450,000	
	24,030,000	19,324,765
Transfer of Accounts of Military Transportation ...		
Free Surplus ... ... ... ...	... ...	19,324,765
Total Deficit ... ... ... ...	... ...	4,705,235

We confess to be somewhat puzzled to understand the explanation of a "Free Surplus" which goes on to show that it is no surplus at all. On the same date, however, the report of Minister Yeh Kung-cho covering the conditions of the ministry was made public, and from this we glean the following enlightening information. It would appear from this report that the Chiaotungpu has been carrying the entire load of financing the Peking government, in addition to other very interesting enterprises which run into high figures. The school budget, the expedition for the relief of Urga, the parliamentary elections and sundry other mooted measures calling for heavy expenditures all seemed to hinge on the ability of the railway board to provide the funds.

It seems that the Bank of Communications raised the modest sum of \$20,000,000 since last

September as its contribution to keeping the government alive, in addition to paying off various obligations that fell due. The ministry also took upon its shoulders the task of providing \$220,000 per month for the ministry of education, \$500,000 a month to the endowment fund for retiring domestic loan bonds, and paid the expenses of the bureau of economic information, which calls for the modest sum of \$480,000 a year, as good as a ministry nowadays. In addition, the Chiaotungpu has handed over to the ministry of finance in the past eight months over \$3,000,000 in cash and domestic bonds, and taken upon its shoulders the construction of the Hukwang railway, which calls for a continuous expenditure of \$160,000 monthly in order to avoid further suspension of work.

A British loan of \$7,000,000 was raised to double track the Peking-Mukden line from Chinwangtao to Shanhaikwan, and construction of the Chinchow-Chowyang branch of the same railway will call for \$5,000,000, spread over several years. A university of communications will cost more than \$360,000. From March to December of this year the ministry will be called upon to pay out \$9,450,000 on interest and amortization of old railway loans, \$11,080,000 on domestic debts and other amounts which bring the total up to \$35,390,000, while the amount of funds that it expects to receive during the balance of the year is only \$14,600,000 of which \$10,000,000 is represented by the surplus earnings of the railways and the balance apparently from the posts and telegraphs.

Minister Yeh was of the opinion that he had done as much as was humanly possible to aid the government in its hour of financial stringency, and if his railway program could be carried out, which contemplates letting in the public to a twenty per cent. interest in the existing lines, he would probably have brought another goodly sum into the war chest.

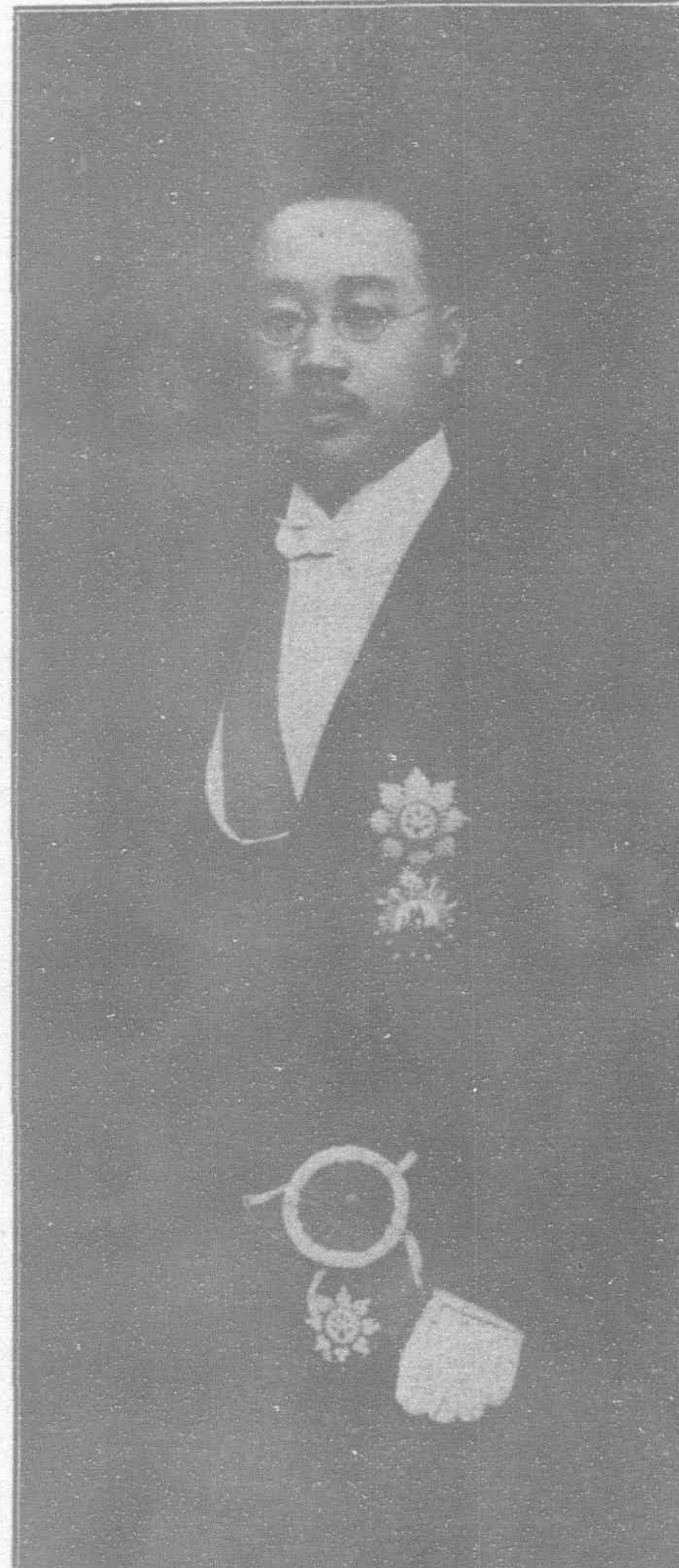
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The Federal Wireless Contract

WE have repeatedly deplored the fact that scheming Chinese officials have foisted off on American financiers, contracts and concessions, which, politically speaking, were loaded with dynamite. Starting with the Manchurian Bank and Chinchow-Aigun contracts down the line through the Currency Reform Loan, the Siems-Carey Canal and Railway contracts, the Continental and Commercial Bank loan to the recent Federal wireless deal, it is the same old story, an apparent determination to compel America to give effect to its conception of the Open Door by pitting us against the other Powers, especially Japan. It was all well enough as a game of wits and diplomacy, this we enjoyed, but when we became convinced, as we did, that such practices were quietly driving us into a position where a "show-down" seemed inevitable, and at a time when the nation was woefully unprepared to enforce its policies, we refused to further support the Chinese in these dangerous tactics.

For as nasty a mess as has ever been brewed in China let us probe into the unsavory story of the wireless deal, and to escape the accusation of bias, we will take the salient features from the *Peking & Tientsin Times*, which cannot be accused of harboring any friendly sentiments towards Japan.

"The summary of the correspondence that has passed between the Japanese and American governments, in regard to the Federal Wireless Loan, is not easy to understand without reference to the contracts referred to especially the agreement concluded between the Ministry of the Navy at Peking and the Mitsui Company, in February 1918. It may be recalled that soon after China had declared war against the Central Powers it was discovered that the Minister for the Navy, Admiral Liu Kuanhsing, was in negotiation with a Danish agent, acting on behalf of German interests, for the installation of German wireless plants in China. The Allied Ministers protested against this utterly shameless transaction, and the Mitsui Company then stepped in, and concluded an agreement with the Minister of the Navy for the erection of a highpower wireless station on a site approved by the Chinese government, at an estimated cost of £536,267. This amount was to be advanced to the Chinese government and repaid in thirty equal annual instalments, interest at the rate of eight per cent. per annum also being paid on the amount outstanding each year. The contractors were to have sole control of the installation during the period of the loan, unless the Chinese government repaid



Mr. Chang Chi-tan
New Minister of Communications

the entire amount before the expiration of the thirty years, and the Chinese government was to receive a royalty of ten per cent. on the receipts of the installation. In a supplementary note, the contractors undertook to respect the terms of the agreements entered into between the Chinese government and the Great Northern and Eastern Extension Telegraph Companies, debarring any other land telegraph station from communicating with Europe or America previous to 1930. Finally, on March 5, 1918 a Declaration was signed under which the Chinese government pledged itself that for the term of thirty years no other party should be allowed to erect a similar wireless telegraph station, for communicating telegraphically with Japan, Europe, and America, nor might the Chinese government itself erect any other wireless installation for this purpose.

The effect of this agreement, then, was to give the Japanese contractors a monopoly of long-distance wireless communication for a period of thirty years, within the territories of the Chinese Republic. And it may be noted in passing that it was somewhat curious that the power to dispose of this monopoly should be in the hands, not of the Ministry of Communications, but of a Minister for the Navy whose conduct was already suspect to the Allies. Further, the Japanese have, as far as we are aware, contributed nothing to the development of long-distance wireless telegraphy most of the important patents for which are held, throughout the world, by Marconi interests. This point is important, because in May 1919 a contract was signed between the Ministry of War and Marconi's Wireless Telegraph Company, providing for the establishment of a Chinese National Wireless Telegraph Company, in which the Chinese government was to acquire a half interest, and which was to have the exclusive right in China, for a period of twenty years, to all Marconi patents. The object of this Company was to enable China herself to manufacture the apparatus necessary for the development of her wireless communications, and the government bound itself, when the goods supplied by the Chinese National Wireless Telegraph Company were not lower in quality, or higher in price, than those offered by other companies, to purchase exclusively from the Chinese Company all its present and future requirements in wireless telegraph and telephone apparatus.

So much for the Mitsui and Marconi contracts, the first of which aimed at a monopoly under Japanese control, the second at creating a national wireless factory, capable of supplying all China's needs, within the territory of the Republic. The Mitsui Station is being constructed at Shungchiao, between Peking and Tungchow; the national Chinese wireless factory is, we understand, being erected at Shanghai.

On January 6, last, a contract was signed between the Minister of Communications, and the agent of the Federal Wireless Telephone and Telegraph Company of America, for a loan of Gold \$4,600,000 for the erection of a longdistance wireless station capable of communicating direct with the United States, at Shanghai, and smaller stations at Harbin, Peking, Canton and Hankow. The American Company is given the privilege of operating these stations for a term of ten years, paying a royalty of one per cent. on its gross revenues to the Chinese government, and the loan is to be redeemed in ten equal annual instalments. On the face of it this contract infringes the Mitsui agreement of February 21, 1918, and the restrictive contracts recognized therein, which the Chinese government had previously concluded with the Great Northern and Eastern Extension Cable Companies. It also violates the contract with the Marconi Company for the establishment of the Chinese National Wireless Telegraph Company. But the American government, has decided to give the Federal Wireless Company its full support, and has notified the Chinese government that repudiation of this contract will be regarded as an unfriendly act.

So we have the following amazing situation: the *Ministry of the Navy* has granted a thirty year monopoly of long-distance wireless communication to a Japanese concern, which is to operate the Shungchiao station for that period; the *Ministry of War* has pledged the government to purchase all its wireless supplies for a term of twenty years from a Company in which the government has a half interest, and which enjoys the exclusive right to all Marconi patents in China for that period; the *ministry of communications*, ignoring both these contracts has arranged with the Federal Wireless Company to erect one long-distance and four medium power stations in China, and conceded to the Company the right to operate them for a term of ten years. Doubtless we shall learn in due course that the Ministry of Interior, the Ministry of Agriculture and Commerce, and the Cabinet Secretariat have all entered into wireless agreements which conflict with those already concluded. And then the Super-Tuchuns may follow suit. . . .

On the other hand there could be nothing reprehensible in an American Company competing for a share of Chinese government business on the basis of better quality and lower prices, if nothing in the nature of squeeze was paid to the Chinese officials concerned. The fault for the whole of the present muddle rests chiefly with the Chinese government, which has behaved outrageously over the whole business. It is obviously out of the question for the Minister of Communications to plead that contracts entered into by the Ministers of the Navy and of War, respectively, in the name of the government, could be treated as mere scraps of paper by his own Ministry. For a long time it has been the common belief in Europe that the word of a Chinese is as good as his bond. In the case of the Chinese government there have been repeated proofs that its word is absolutely worthless. Valuable consideration was given both for the Mitsui and the Marconi contracts, and deplorable though the terms of the former were, and indefensible in the case of Powers claiming the right by Treaty to "most favoured nation treatment" it is preposterous that both these contracts should be calmly violated without any negotiation with, or explanation to, the parties interested. The Chinese government has been guilty of a gross breach of faith, and it is singularly unfortunate that the American State Department should find itself in a position where it deems it desirable to uphold that government in violating previous obligations. Is it, we wonder, quite satisfied that in so doing it is really standing for the "open door" principle, rather than the private interests of the minister of communications?——

Just so. Is it the Open Door doctrine that is worrying the Chinese officials, or the private interests of the old Chiaotung clique who have twice before ignored their contracts with other Powers, in order to pit the United States against Japan. The state department had no option other than to protest and stand upon the treaties which prohibit the creation of monopolies. Obviously, America will always be in hot water and at loggerheads with the other Powers under such conditions, for it is impossible, even by taking up arms, to defend an Open Door policy when the beneficiary of that policy is forever closing the Door in our faces.

* * *

Japan and the League of Nations

TO be an advocate for, or to pit one's self against, the League of Nations, is to take part in a movement destined sooner or later to bring the nations of the world into a solid, homogeneous brotherhood. Whether this brotherhood will perform a better duty to mankind than will the detached individualism of to-day it is not the purpose of this article to conjecture. In passing, it will not be remiss to remember the brothers Cain and Abel, and, in fairness to the supporters of the contention that these two brothers are the exception to an otherwise unbreakable relationship, the brothers their names have flown for the nonce.

It seems that the opposers to the league do but stir a greater enthusiasm in the make up of *les advocates* for it is not difficult to see the great movement surmounting obstacle after obstacle, all of them necessary in the evolution of any imperfect vortex, shaping it, smoothing, planeing and even gouging where this drastic measure commands application. In Japan are its promoters no less active than they are in the other countries of the world. Whether the movement comes under the name of League of Nations or any other appellation it does not matter. Each one is a means to an end and the end is co-operation, not separation. Little is known of the movement in Japan but now comes a booklet entitled "League of Nations Association of Japan" in which one can read of an activity which is not only enlightening but inspiring. Such prominent gentlemen as Prince Tokugawa, Viscount Shibusawa, Baron Sakatani, Dr. J. Soyeda and Mr. J. Inouye are the officers of the association who have with them, acting as the executive committee, such well-known leaders in Japan as Count Yoshii, Dr. K. Hayashi, Dr. S. Hozumi, Dr. M. Oka, Dr. M. Yamakawa, Dr. M. Anesaki, Mr. D. Tagawa, Mr. S. Akizuki and Mr. T. Miyaoka. The principal articles of the rules follow:

Article 3.—The association shall have for its object the carrying into practical effect of the spirit of the League of Nations.

Article 4.—The association shall undertake the following activities with a view to the realization of its object:—

- (a) The organization of research and discussion upon matters relating to the League of Nations.
- (b) The holding of public meetings and the publication of literature.
- (c) The maintenance of relations with other organizations, whether foreign or Japanese, having a similar object to that of this association.
- (d) The sending of delegates to the International Congress of the League of Nations Associations.
- (e) Any other work deemed proper by the executive committee.

Article 5.—Members shall all be Japanese subjects who, in general acceptance of the aims and purposes of the associa-

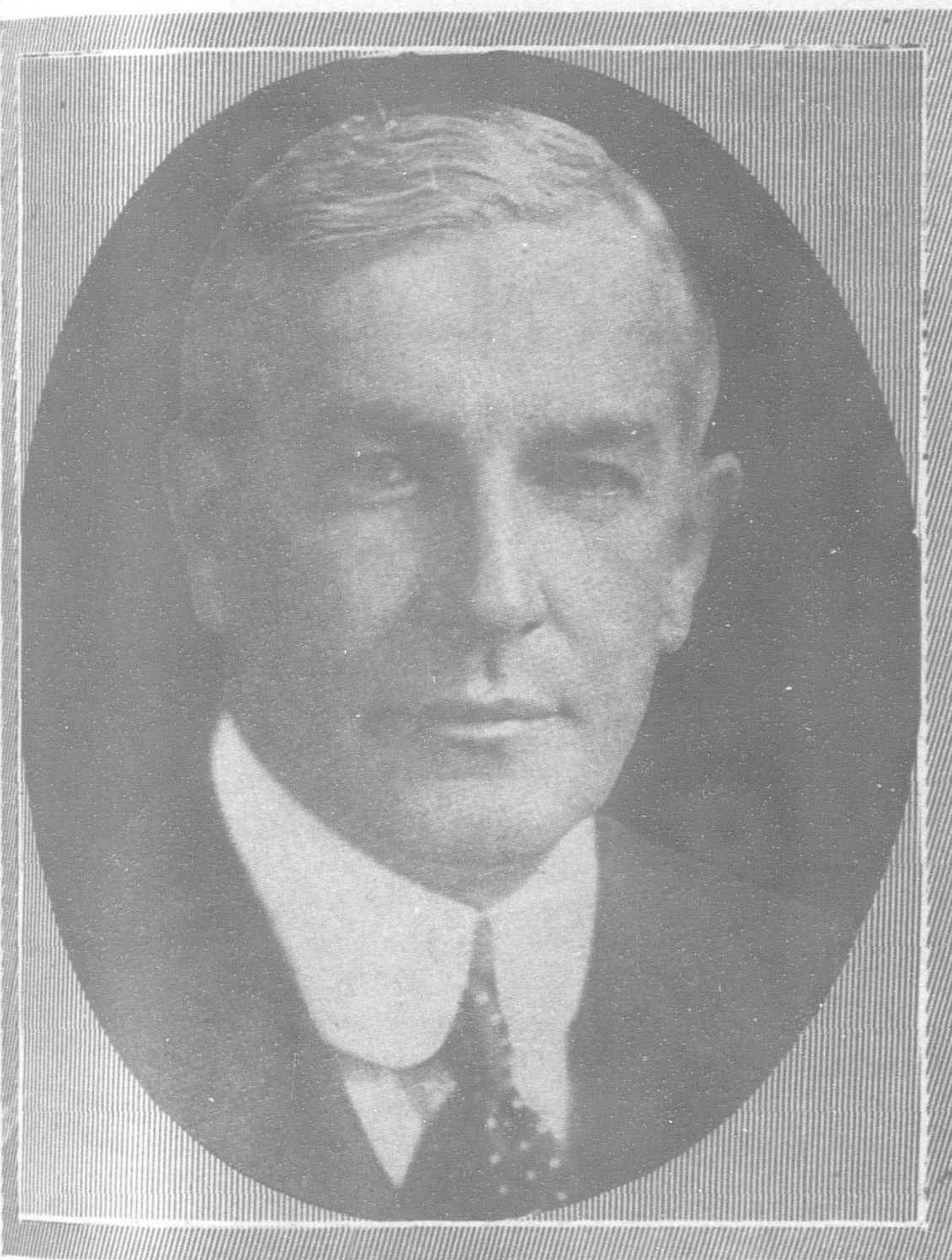
tion, signify their desire to join it on the recommendation of two or more of its members.

There are other articles, but these are perhaps sufficient to outline the work contemplated by the organization. Supporters of the League of Nations movement will welcome this new organization with great acclaim and a perusal of the booklet which is published by the association from Uchiyamashita-cho, 1-1 Kojimachi, Tokyo, will show very clearly the sincerity of the movement actuated by the wholehearted support of the nation's greatest servants.

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The American Under Secretary of State

IT was not difficult for President Harding to find an able and experienced assistant secretary of state from the ranks of the Republican party. That he should have selected from this array of talent the man probably best equipped for the post is, however, a matter of congratulation to the nation. In the appointment of Mr. Henry P. Fletcher to assist Mr. Hughes, the state department



Mr. Henry P. Fletcher

American Assistant Secretary of State

will benefit, and we can expect that once more it will take its place as the most important branch of the government, instead of being, as it has for the past eight years, the puppet of the executive office. Few indeed are the active American diplomats with a wider and more intimate knowledge of problems that confront the nation in the Pacific than the energetic ambassador elevated to this high office. His record in China as chargé d'affaires stands unequalled by any American minister to this country. The fight which brought the American Group into the Hukwang Loan,

and paved the way for international co-operation in China was borne and won by Mr. Fletcher whose official support and constant advice enabled his friend and associate, Mr. Willard Straight, to win his point. In the game of wits with the older and more experienced European diplomats and financiers, the young American chargé proved himself their equal. It was a great loss to American interests in the Far East when he was ordered to Chili. Fortunately, his place was taken by an older and abler man, Mr. W. C. Calhoun, the highest type of international lawyer our country has produced. With the passing of Fletcher and Calhoun, American diplomacy in Peking has been more influenced by sentiment than by the facts of the situation.

With a return to reason and a realization of our international duties and obligations, the conduct of our Far Eastern diplomacy is certain to take a new course. The earnest desire of President Harding is to promote friendly relations between America and Japan, and it can be taken for granted that the same policy will dictate the conduct of the state department. With proper co-ordination and team work between the executive, the state department and the representatives of the government abroad, the nation will no longer be treated to the spectacle of Washington expounding one policy to the people at home while its representative on the other side of the Pacific is placing his own interpretation on it, and creating issues that make for war.

Mr. Fletcher's experience as ambassador to Chili and Mexico in addition to his strenuous work in Peking makes him one of the foremost American experts in the problems that confront the nation in the Pacific. That the President has selected him for the post of assistant secretary of state is simply a testimonial to his powers of good judgment, a fitting recognition and recompense for some of the trials the young ambassador has passed through in the past few years in trying to defend American rights in Mexico in the face of a set policy to let matters drift.

* * *

The British Engineers' Association

MODESTY is a characteristic of the average Briton. Especially does this hold true with the British engineer and machinery manufacturer, whose products in the past have found their place throughout the world, without undue advertising or publicity, largely on their intrinsic merits and to the personal activities of energetic agents. Where other machinery manufacturers have expanded their business through judicious advertising and descriptive matter furnished to the technical press, it has been most difficult, if not impossible, to move the British manufacturer to adopt the same practice. As a result, other nations have found markets for their machinery even in spheres dominated exclusively by British interests. Conditions, however, are changing.

For six heartbreaking years, the vast machine shops of Great Britain were turned into munitions factories, and it was in this time that the British engineer saw his foreign trade and connections sacrificed in order that he might give his all to save the empire.

The armistice came and the world rushed to place its orders for machinery and equipment, but again the British were handicapped, this time being unable to quote deliveries until their plants were re-equipped for peace purposes. Two years have passed and gone. Little by little the British are coming back. Their agents, experts and engineers are in the field, ready to quote prices, make deliveries, and buckle down to the hard work of regaining their lost position. They are making good. No honest or honorable ally having in mind what they have gone through will begrudge them success.

The British Engineers' Association, whose activities were crippled during the war, has been reorganized under a new directorate

and new program and is now prepared to win back its lost position. We have received its Official Directory of Members. Its preface indicates that the old policy of hiding their light under a bushel may be abandoned. Mr. D. A. Bremmer, one of the association directors, after inviting attention to many great British achievements in the realm of mechanical engineering, concludes as follows:

"The note struck in this article may sound a little strange to a world accustomed to British modesty and even self-depreciation. It is just as well that the new note should be struck without delay. In the past, the British engineer has been too prone to hide his light under the bushel, too unwilling to cry his wares in the market places, and too proud to claim from ungenerous rivals the credit due to his past record and present performance. He has suffered much more from these causes, combined with a seldom appreciated sportsman-like willingness to "give the other chap his full due." In the world of to-day the indulgence of these amiable weaknesses is quite too expensive. It is high time to abandon them, and commence to pursue our business on the assumption that the other man will not know unless you tell him, and will not remember, unless you reiterate often and loudly enough to exercise something akin to hypnotic power of suggestion."

The British engineer is evidently awake and "on the job."

The Official Directory is invaluable to those in foreign countries as a register of high-class engineering firms guaranteed by the association.

* * *

The Largest Purchaser

THE March bulletin of the Park-Union Foreign Banking Corporation says that the business situation in China is still badly clouded by the famine, political uncertainties, exchange conditions and reduced buying by foreign countries. The native bankers, even though reported to have ample funds, are not desirous of granting credits for export activities. There has been, however, a material resumption of silk exports to the United States.

The largest Manchurian purchaser of American products, the South Manchuria Railway Co., proposes to spend more than \$200,000,000 gold upon improvements and extensions within the next five years.

* * *

"Pull Together!" Hoover's Slogan

HERBERT Hoover, the new secretary of commerce, declares that the rapidity with which the nation can get out of the economic ditch will depend largely upon the degree to which we pull together. His program is a long one and a wise one.

Hoover promises to live up to his reputation for solid sense and organization ability. In referring to foreign trade he undoubtedly meant that his remarks should cover the Far East. Here of all places in the world, Americans should pull together and co-ordinate their efforts towards building up trade. Trade and politics are bad bed fellows.

* * *

The Ancients and the Peking Tramways

IF China's monarchs of the past have a consciousness that makes of worldly affairs any concern to them, they must be hovering over Peking afame with indignation and aghast at the effrontery imposed upon the sanctity of the capitol and their personal dignity. Mere man, that worldly individual whose propensity for restlessness makes of the world a generator and perhaps a magnet, has concocted one other scheme to draw the seeker of repose away from his Sylvan-dell; his sunlit, grassy

lawn. Did he confine his activities to spheres wherein no princes, soldiers, leaders, masters of art, music and literature, held sway to the satisfaction of a horde of admiring sycophants, then no tempest could reign in the heavenly domains, if such there be. But he does not. He comes with his tall wireless mast and erects it in the sacred Temple of Heaven in Peking. He comes with his modern, many storied building, and erects it in the Tartar city of Peking. He comes with his aeroplane and flies over the sacred of sacreds, the Forbidden City of Peking. He comes with his motor-car to scatter the ancient cart and mule in confusion by the way side . . . and now! He will have those byways and highways of China's sacred city turned into modern thoroughfares on which the clanking tramway will pursue its domineering course. Surely, surely the pink mortar over the tomb of the great Chien-lung becomes cracked with the risings of a disturbed tranquility. One wonders!

History teaches that innovation has always met with a large measure of disfavor. In this age invention is hailed and loudly applauded, but there are those, and they must not be forgotten, who view with misgivings, a march which leads to what others believe is a possible millenium. Perhaps it is these, who, by their opposition, create the impetus which drives towards restless activity. Man's curious mentality spurs him to meet opposition with grim determination. And if this is so, and if the lovers of the great past and those imbued with the spirit of ancestor worship are bringing nearer the haven which all mankind seeks, then their misgivings are worth-while, meritorious. And it may be that instead of writhing and committing contortions in the heavenly ether, China's monarchs of the past look down with a benign complacency, a satisfaction with present time progress, and a wistfulness that no hand can be taken in the movement forward. Perhaps this wistfulness is tempered with a knowledge that their activities in the past have all helped to make possible this progress of the present. And, therefore, the Peking tram car loan may not be looked upon with disfavor if these thoughts which form an attitude are taken into consideration.

Information regarding the project is as follows:

It is authoritatively reported that, on the basis of the five per cent. loan concluded in the second year of the Republic of China between the ministry of finance and the Banque Industrielle de Chine, an agreement consisting of 18 articles has been signed. The following are the main points of the argeement:-

1. The Peking tram-car company shall be established by government and people, each subscribing \$2,000,000.
2. All the government shares to be paid for with the five per cent. loan concluded with the Banque Industrielle de Chine.
3. The superintendent of construction to be a Chinese.
4. Chief engineer of construction work to be a Frenchman.
5. A board of directors with six representatives of the public and six of the government, the latter including the manager of the Banque Industrielle de Chine.
6. In case foreigners are employed in connection with construction work, the selection of them to be left to the French concerned.
7. Head of the business office to be a Chinese and the sub-head a Frenchman.
8. Chief accountants shall be a Chinese and a Frenchman.
9. With regard to the purchase of materials, preferential rights shall be accorded to France.
10. Prior to the complete repayment of the five per cent. loan of the second year of the Republic of China, the sale or purchase of the government shares of the present company to be prohibited.

And so. Into the past is woven the present, and the mesh of the present is open for the mesh of the future. Electricity, and all the potency in this great wonder with which the world is yet by no means entirely familiar, may be leading to wonderful progress, making the tramway an object of antiquity deemed perhaps by some of a later generation a sacrilege to replace.

The Mines and Minerals of Yunnan

South China

By J. COGGIN BROWN, O.B.E., D.Sc., M. Inst. M.M., F.G.S.

Geological Survey of India

The author gives a description of the mineral resources of Yunnan, the most south-westerly of the Chinese Provinces, adjoining Burma and Tongking

From the Mining Magazine

FUTURE OF COPPER MINING IN YUNNAN.—In my previous article I gave particulars of the known copper deposits of Yunnan, and showed that the output is lower nowadays than it used to be. This decline of copper mining during the last fifty or sixty years is due to a number of causes. Prominent among the internal ones are the following:—

- (a) Partial exhaustion of rich ores above ground-water level.
- (b) Political disturbances and strangulation by too strict official control.
- (c) Destruction of the forests with no attempts at reafforestation, and consequent lack of charcoal in large quantities at the smelting centres at cheap prices.
- (d) Difficulties of transportation.

Although I believe that the earlier French writers were to some extent led astray by too complaisant an attitude toward Chinese accounts, and formed too exaggerated an opinion of the copper resources of Yunnan, I do not accept in their entirety the rather gloomy predictions of the engineers who have investigated the question at later dates. It is admitted that there are no important deposits within reasonable distance of the Tongking-Yunnan Fu railway, but it is necessary to look further ahead when other lines will doubtless traverse the country, and open up regions which are now most inaccessible. I do not believe that there are any important deposits unknown to the Chinese, unless they are situated in the remoter parts of Yunnanese Tibet, neither do I think that the lean deposits of small extent will

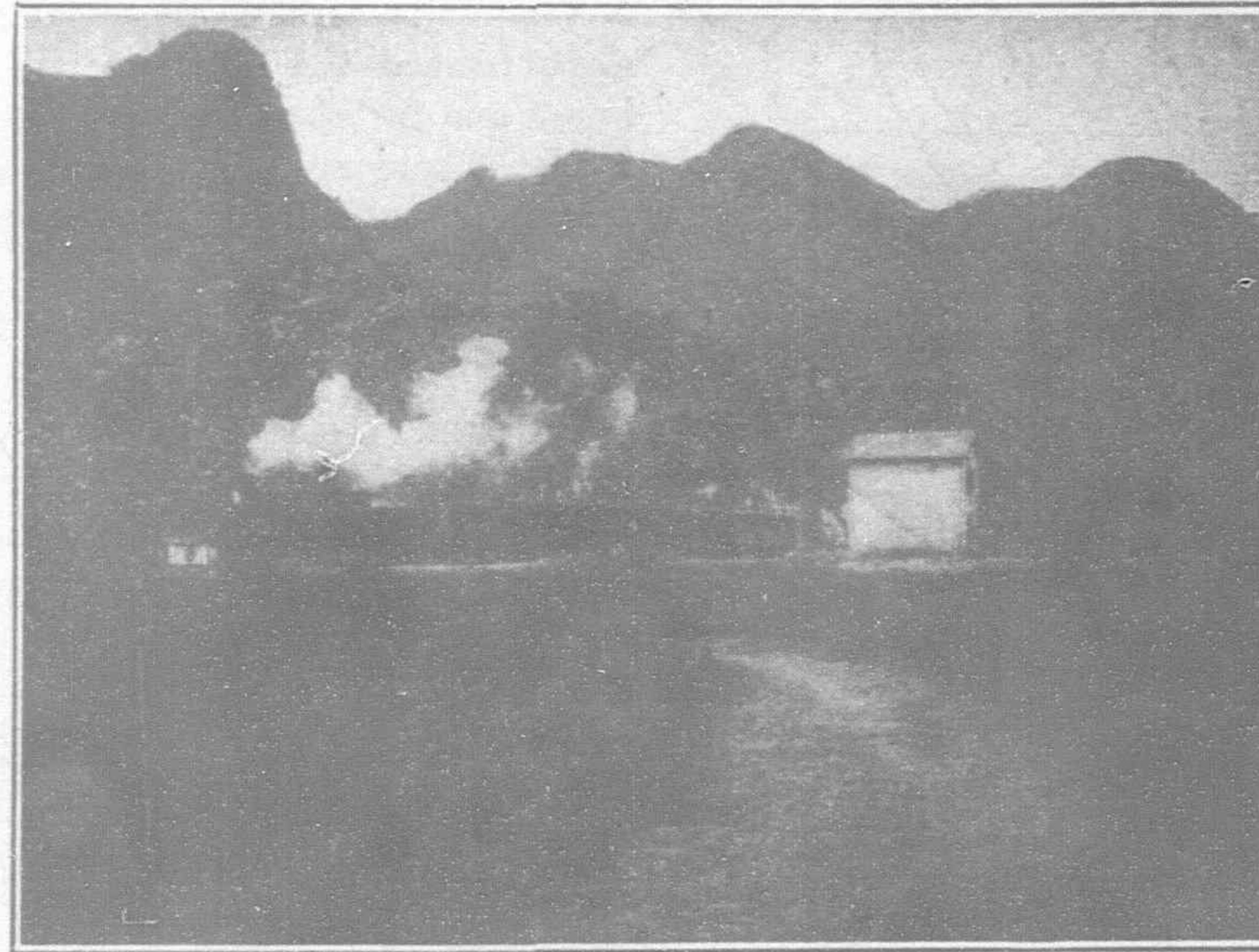
ever lend themselves to exploitation on modern lines. At the same time I am convinced that Yunnan possesses considerable reserves of copper ores, at depths at which indigenous methods have failed to reach them. While it is impossible to point to any particular example, I conclude that the larger deposits in the districts of Tungch'uan Fu, Weining Chou, Yungpei T'ing, and perhaps Linan Fu, Lichiang Fu, and Weihsi T'ing, merit careful individual attention, and that some of them will probably repay the attention which they may receive. The future growth of copper mining and smelting in Yunnan will depend on scientific application of the most recent practice, and this cannot be done either by European or Chinese until better transport facilities are created in most cases, and a more generous attitude is adopted by the administration towards all.

LEAD AND SILVER.—Although it seems probable that in the past Yunnan has furnished large quantities of silver from the

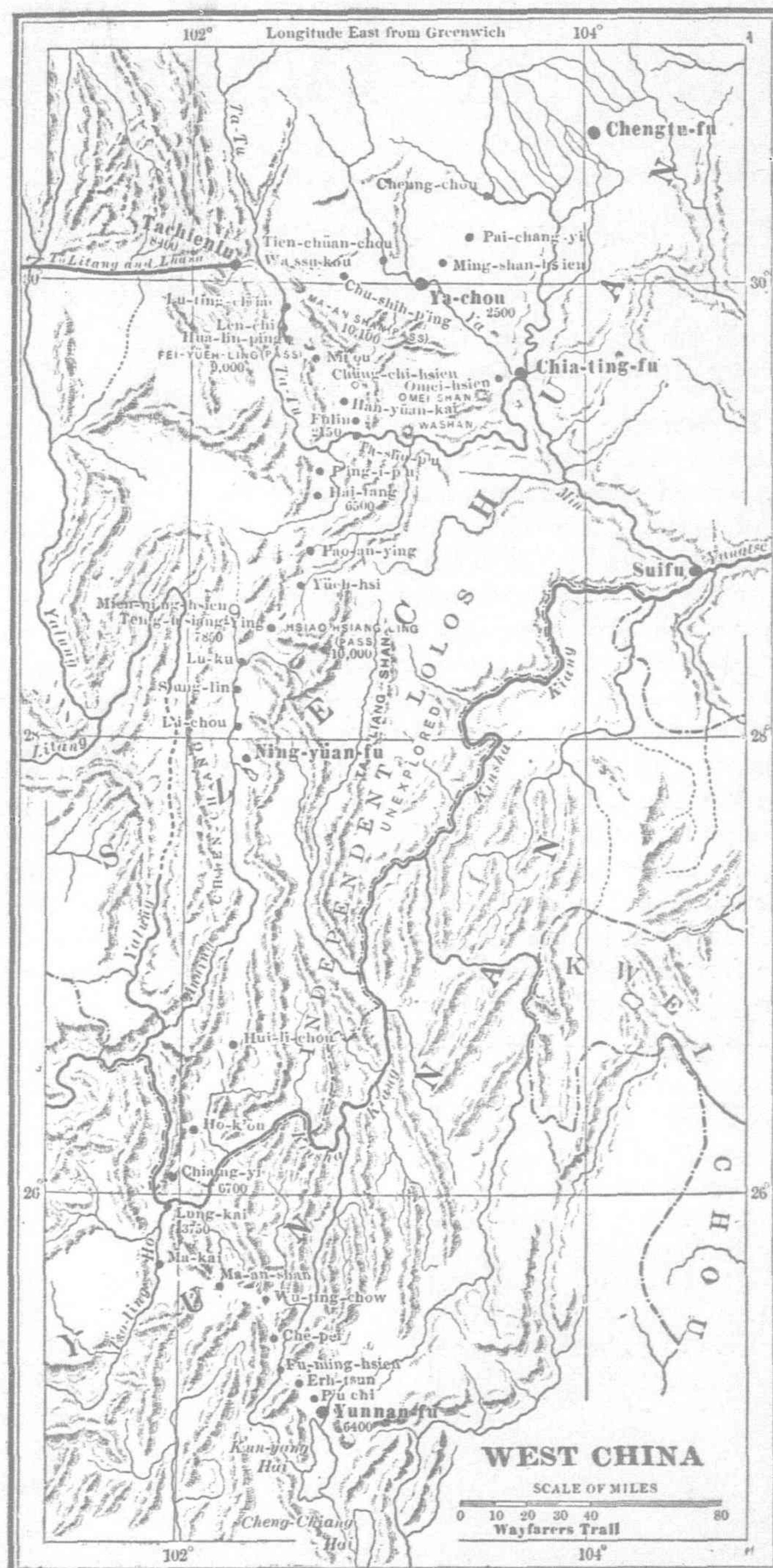
cupellation of argentiferous lead, to meet the demand in other parts of China, the available information regarding the deposits themselves is meagre. The Chinese exploitation of the Bawdwin mines in the northern Shan states of Upper Burma for silver proves how far afield the old imperial government was once prepared to extend its operations in search of silver. Some idea of the importance of lead and silver mining in Yunnan about the middle of the 18th century can be gleaned from the long list of mines given by Rocher. Leclère in 1898 estimated the annual production of lead in Yunnan at 3,000 tonnes. He did not think that the deposits were important enough to justify expenditure on communications to them. Lodes containing lead ores were not as numerous as copper lodes, and he considered that they are only well developed in certain localities, notably around Kochiu and Weining Chou. In the former locality the lode at Longteotchai was extensive and very regular, though when Deprat wrote in 1911 the workings had been abandoned. It was clear that many of the residues accumulated under the Chinese system would be amenable to European treatment. Lantenois received information regarding an argentiferous lead mine at Pansan, one stage to the north of the Ouaitouchai mines, where there were estimated to be 10,000 tonnes of lead slags probably worth re-treatment. Duclos remarks on the difficulty of separating lead and zinc mines owing to the constant association of galena and zinc blende in Yunnan. He has given a long list of mines compiled from Chinese sources. Davies has drawn attention to the fact that there is an export trade in lead and zinc as well as copper from Yunnan to the Yangtze valley. Regarding the occurrence of silver he wrote:

“The metal is if anything more abundant than copper, and one can seldom travel far in Yunnan without seeing or hearing of silver mines. I doubt if there is any large district in the province which does not produce silver. Many of the mines are well worked and Yunnan supplies much of the silver used in other parts of China.”

LEAD MINING IN THE MINGKUAN.—This is the name given to part of the valley of the Nolo Ho, a tributary of the Lung-chiang, which is the Shweli of Upper Burma. It lies about 30 miles due north of Tengyueh, and some 24 miles due east from the Burma frontier in the vicinity of Myitkyina. That the valley has been the centre of a considerable copper and lead-smelting industry in the past is proved by the number of old adits that enter the hills at various places, by the remains of ancient furnaces, and by the slag heaps. I found slag heaps at various places, the largest being at Hsiaohsinkai, Hongtoohai, Kantungpa, and in the valley which forms the pass leading from the latter place to



To Parts of Yunnan by Rail



The Course of the River of the Golden Sands

"Richer in Mineral Wealth than any other part of China, and one of the most highly Mineralized spots in the whole world." (Page 395)

Kaitou. There is some reason to suppose that these slags could be re-treated profitably and the large quantities which exist make the Mingkuan worthy of attention. I was told that some of the heaps were 300 years old. I examined ore deposits at Hsingai-chang, Tongshan, and Hongtoohai. At the former, prospecting operations in granite had revealed several promising-looking stringers of oxidized lead ores. At the second, the ore, consisting mainly of galena with some zinc blende, limonite, and oxidized copper ore, occurred as infillings in certain parts of a broken and recemented limestone. Hongtoohai is the name given to a mountain over 6,800-ft. high. There are numerous portals of old tunnels and the remains of broken-down furnaces at its foot. Two levels were being worked, and the ore-body was met with about 120-ft. in from the portal. It was 15-ft. in width at the face, without its limits on either side being visible. A second level, some distance above the first, met the ore-body about 30-ft. in from the portal. Its limits were not visible. On the top of the mountain, over 200-ft. above the level of the lower adit, there is a large outcrop of, presumably, the same ore-body. Adjoining the limestone on its western side, it continued about 20 or 30 yards in breadth to the

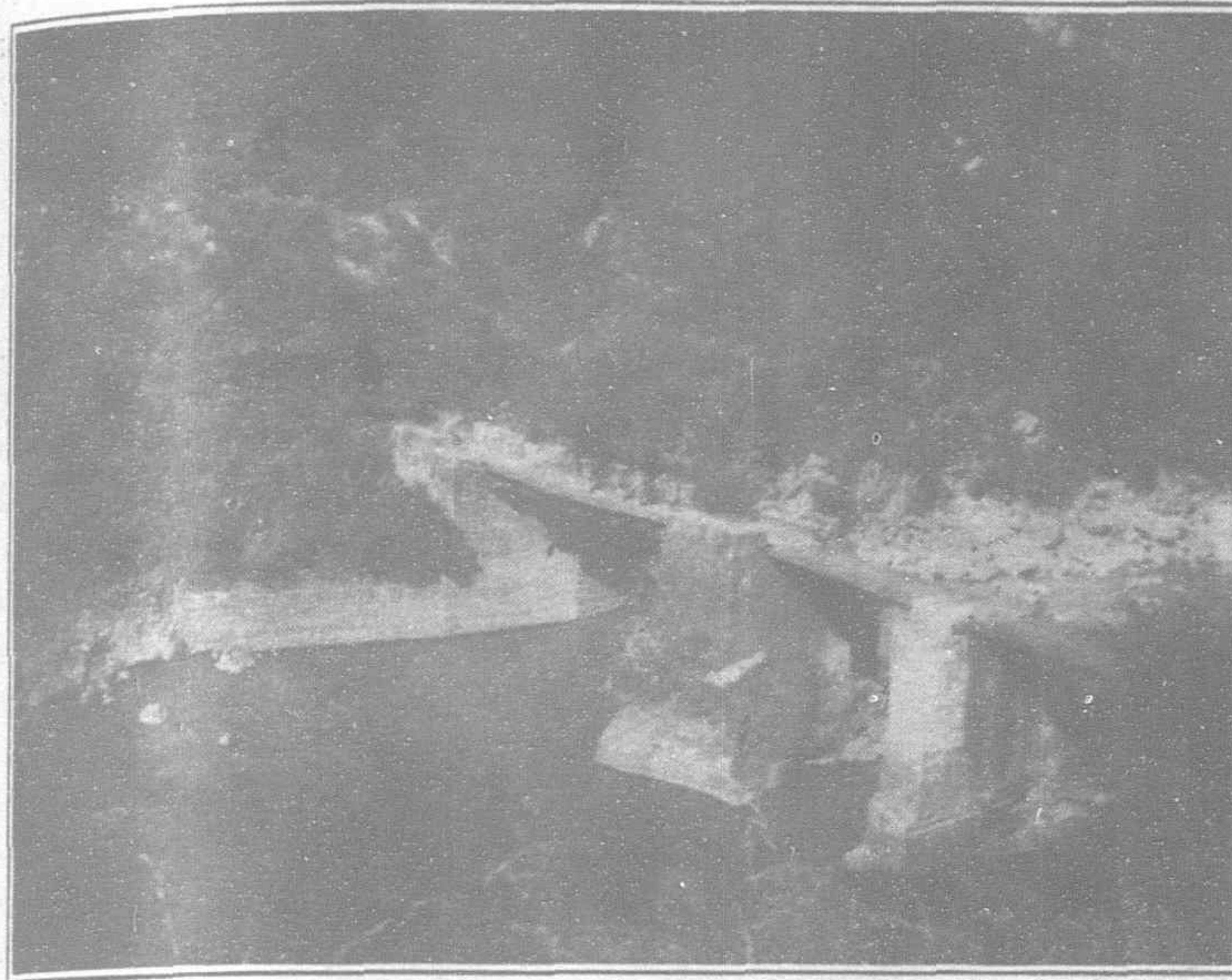
steep side of the mountain, where it could be seen cropping out some way down. In a north and south direction I traced the outcrop for over 120 yards. The ore consists of iron pyrites with small quantities of pyrrhotite, and smaller amounts of chalcopyrite and galena. There is a large quantity of it available, and I should like to have made a proper examination of the whole occurrence. This I was unable to do. The Chinese miners planned their workings to obtain the largest amount of lead and copper ores. There are several other localities in the Mingkuan where argentiferous lead ores occur, and I consider that this valley, and the surrounding territory, is a field which holds out much promise to the prospector. Samples of galena from Tongshan contained over 156 oz. of silver, and from Hongtoohai over 123 oz. of silver and appreciable traces of gold per ton of lead. A slag from Hsiaohsinkai contained over 6 per cent. of metal, mainly copper, with a little lead.

The mining of galena by the Yunnanese is carried on under much the same rules as those adopted for other minerals. The ores are first hand-picked and then crushed by stamps or by hand. After concentration in sluice-boxes they are calcined with charcoal in stalls, and the agglomerated sintered material so produced goes to the blast-furnace. The lead-smelting furnace is from 7- to 9-ft. high, built of brickwork and lined with a refractory material. The shaft is roughly square in section with rounded corners, swelling out into a funnel shape toward the top, from which charging is done. The front is made of a double wall of brickwork which can be pulled out and renewed when necessary. It contains the slag and tapping holes. The cylindrical blower, generally worked by the vertical-axled water wheel, is raised a little above the level of the hearth, so that the tuyere slopes directly down into it. The lead is cast into small pigs and is then sent to the cupellation furnace. This is of hemispherical shape, between 5-ft. and 6-ft. across. The hearth is only slightly concave and has a slope toward the door. There are two doors in the front, the lower one for charging and the upper one for firing. The metal is placed under the fire, which is supported on a grating above it, and is thus heated by radiation from the incandescent charcoal which forms the fuel. Litharge is removed by means of an iron rod. The process is a very tedious one, and the silver has to pass through the hands of a refiner after it comes from the cupellation furnace.

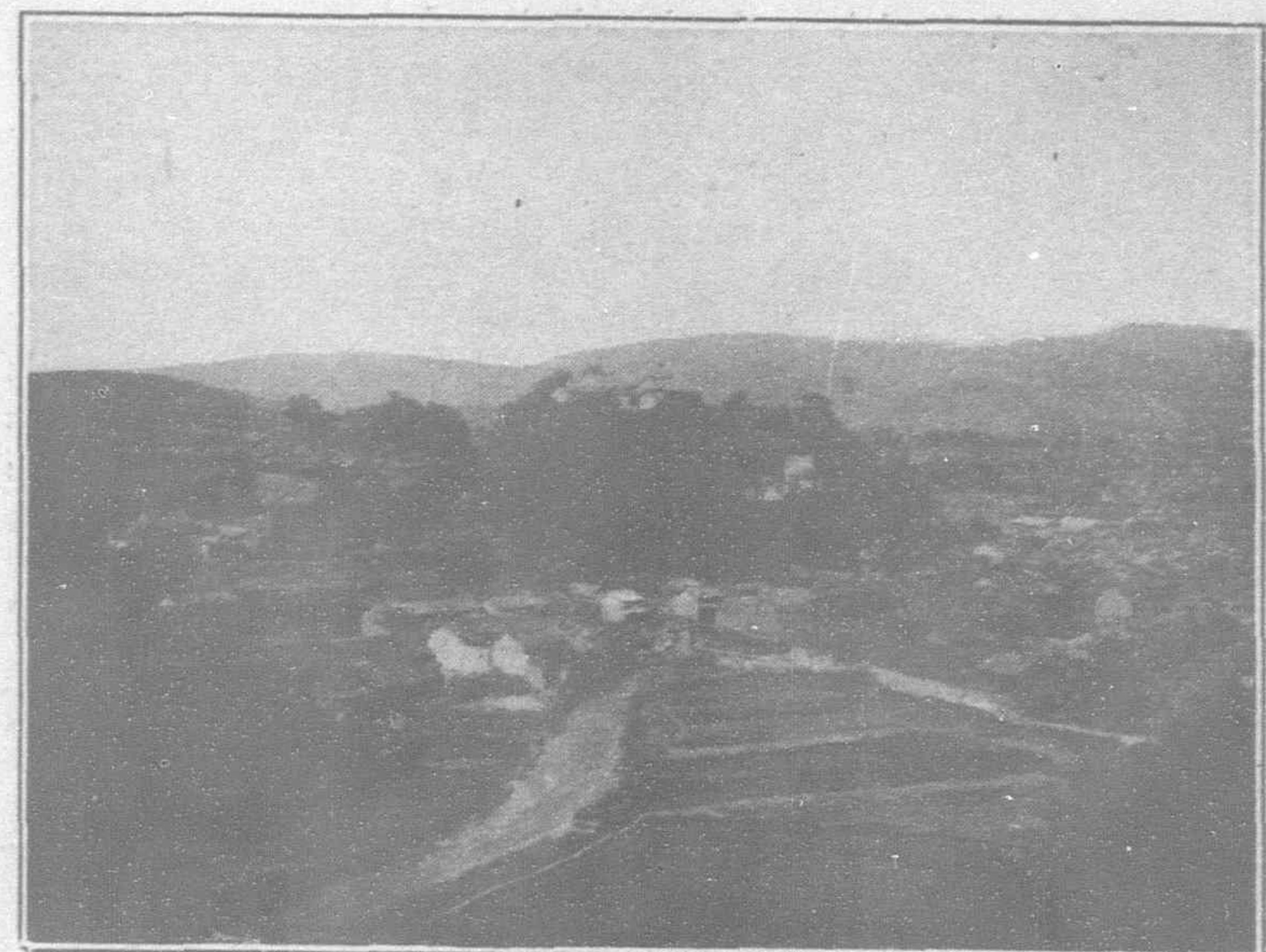
OTHER LEAD LOCALITIES.—Galena was mined on a small scale in the hills at the eastern extremity of the Pupiao valley, Yungch'ang Fu prefecture, from a narrow vein in permo-carboniferous limestone. In Chêngkung Hsien I was shown specimens of ores which were said to come from Yangwanshan, a locality in the hills to the south-west of the city. In Chingtung T'ing I saw galena reported to come from the Changsa region. The two following mines are said to produce silver in the Yungpei Ting



As the Valleys look from the Railway



An Old Bridge near Siukiaton



Koputsuen, A Valley Village

district: Peininch'ang and Erhp'ingch'ang. The mine of Lomicha, in the Lichiang Fu prefecture, is said to produce silver. In a side valley at the head of the Monglai plain, passed by the road descending from Pangwa in the Yung Chou district, there is an old lead mine. In the Chinese Shan states of Kengma and Menghsa, on the Kunlon ferry route to Yun Chou, it is said that there are three large lead mines which were abandoned about 100 years ago. Great quantities of slag are said to exist near them, and specimens were shown to me by the Shans. In appearance these slags were indistinguishable from those of Bawdwin. The two mines in Kengma are called Manpiench'ang and Herhshan-ch'ang. The one in Menghsa is said to be only six *li* from the town of that name.

ZINC.—Zinc blende is an almost invariable associate of galena in Yunnan. The chief use of the metal is as an alloy in the coinage of cash. I have not seen zinc smelting carried on, and as far as I am aware the ores are not reduced in the western or central parts of the province. They are said to be mined and smelted to the north of Huili Chou in Ssueh'uan, but the most important centre is at Weining Chou, just within the borders of Kueichou. Duclos has described the methods adopted.

FUTURE OF LEAD, SILVER AND ZINC MINING.—The fall in the price of silver is held by some authorities to have been the chief reason for the decline of the lead and silver industry in Yunnan. If this be read with the causes I have already advanced in the case of the copper mines, such as the general economic paralysis brought about by the rebellion, the rigorous official control, the exhaustion of easily won surface ores, and the want of an abundant fuel supply, a greater measure of truth is pro-

bably arrived at. That modern methods can be successfully applied to ancient Chinese lead mines is proved by the operations of the Burma Corporation, and by the not inconsiderable quantities of mixed lead and zinc sulphides exported before the war from Hunan. The mixed sulphide deposits of the Mingkuan and the reported occurrences in Kengma and Menghsa, are within comparatively short distances of the Burma frontier. Their existence should not be lost sight of in this connection. Whether the deposits of the far interior will ever be worked on a large scale seems to depend more on the future development of communications in the province than on anything else.

TIN.—I have not visited the famous cassiterite deposits of Kochiu in the Mengtzu region of Southern Yunnan, but they have been described by Leclère, Deprat and W. F. Collins. These mines and their associated smelters form the most successful mineral enterprise of Yunnan at the present time. According to Leclère



The Railway Line Scaring a Steep Hillside

the mineral is derived from the denudation of the upper portions of ancient lodes, owing their origin to the tourmaline pegmatites injected through strata up to the Lower Trias in age. When Mr. Collins visited the mines about 30,000 men were employed altogether, and the deposits them being worked were all of alluvial origin. (See his paper on the subject, December, 1909, *Institution of Mining and Metallurgy*, and *The Mining Magazine* for January 1910.) Deprat believes it is unlikely that other tin-stone deposits will be found in Eastern Yunnan outside the Red River region, as the geological conditions are not favourable. I hold similar views regarding those parts of Western and Central Yunnan that I have traversed.

ORPIMENT.—The importation of orpiment (arsenic trisulphide) from Yunnan into Burma has been going on for a considerable number of years. The mineral is mentioned by the earlier writers who visited Upper Burma before the annexation, and of later years the traffic in the ore has increased, and the traveller by the main trade route is impressed by the number of mule caravans met with bringing orpiment down to Bhamo, whence it reaches Mandalay and Rangoon. Owing to the inaccessibility of the country and to the secrecy of the merchants engaged in the trade, no one had discovered the exact locality of the mines nor had they been visited by a European previously. They lie at the head of a narrow ravine, probably a tributary of the Yangpi Ho, itself an affluent of the Mekong, at an elevation of over 8,000-ft. above sea-level, two days to the south-west of Hsiakuan or three days from Tali Fu. Except for small isolated communities of Lolo tribes, the country passed through is uninhabited, and consists of bleak, sparsely-wooded mountains. Food for both man and beast has to be carried with the traveller. The district is unsurveyed, and my own observations were hampered by the inclemency of the weather. Blinding snowstorms swept the hills during my stay, and this, with the intense cold, made outdoor work somewhat difficult. The rocks in the immediate vicinity of the mines consist of reddish, reddish-purple, and hard greyish quartzitic sandstones, with black bands in places, and reddish, nodular shales. Probably these rocks are associated with the red beds series. During the period of Mohammedan influence in Yunnan the mines are said to have been worked by the rebel powers centred in Tali Fu. After the fall of that city they have been entirely controlled by the Chinese. Mineral was being won from seven drifts which entered the hill on the north-east side and proceeded down as steep inclines, until the ore-bearing stratum was reached. The workings that I was permitted to examine had been made with thoroughness and care. None of the drifts were very extensive. The deposit appeared to be confined to one particular band of greyish quartzite, associated in places with soft black shales. The whole of the former band was more or less mineralized. There was no distinct vein or single

fracture. A thorough shattering of the rock seemed to have taken place and orpiment to have been deposited in the bedding, joint, and fracture planes, and also to have replaced the minerals of the rock to some extent. Small quantities of realgar (arsenic sulphide) occurred, and minute cubes of iron pyrites were found. The arsenic sulphides were in irregular strings, swelling out into patches and bands, which sometimes attained a thickness of over 12 inches. These larger lumps, however, did not persist very far, but only continued a short distance before being replaced by others. The mineralized band was at least 4-ft. thick, perhaps much more, and I can express no opinion as to its lateral continuations, which may be considerable. I have no views to offer as to the origin of the ores. All the work was done by hammer and chisel, and the broken ore was carried to the surface in baskets. The richer pieces were picked out and the remainder roughly crushed and panned in closely woven bamboo baskets to separate the gangue. There was a great waste of the finer disseminated ore by these methods; indeed it was surprising how much material was rejected. The waste heaps must contain large quantities of mineral, which could be easily recovered by means of a simple concentrating plant. Most of the orpiment is exported to Burma, though a little, with the realgar, is kept for local sale.

GOLD.—Gold dust has always been an export from Yunnan, and quills of it may be purchased to-day about the frontier towns of Burma. There is a gold-beating industry in Tali Fu, and Yunnanese gold leaf doubtless gilded many of the old Burmese pagodas. Yet these facts, coupled with Marco Polo's story of the gold currency of the western dominions of the great Khan, and the custom of 'ts inhabitants in covering their teeth with thin plates of gold, "which are fitted with great nicety to the shape of the teeth and remain on them continually," do not warrant the exaggerated notions of some writers regarding the auriferous riches of Yunnan. As far as I could gather there is only one lode-gold mine in the province, and most of the production, whatever its total amount may be, comes from

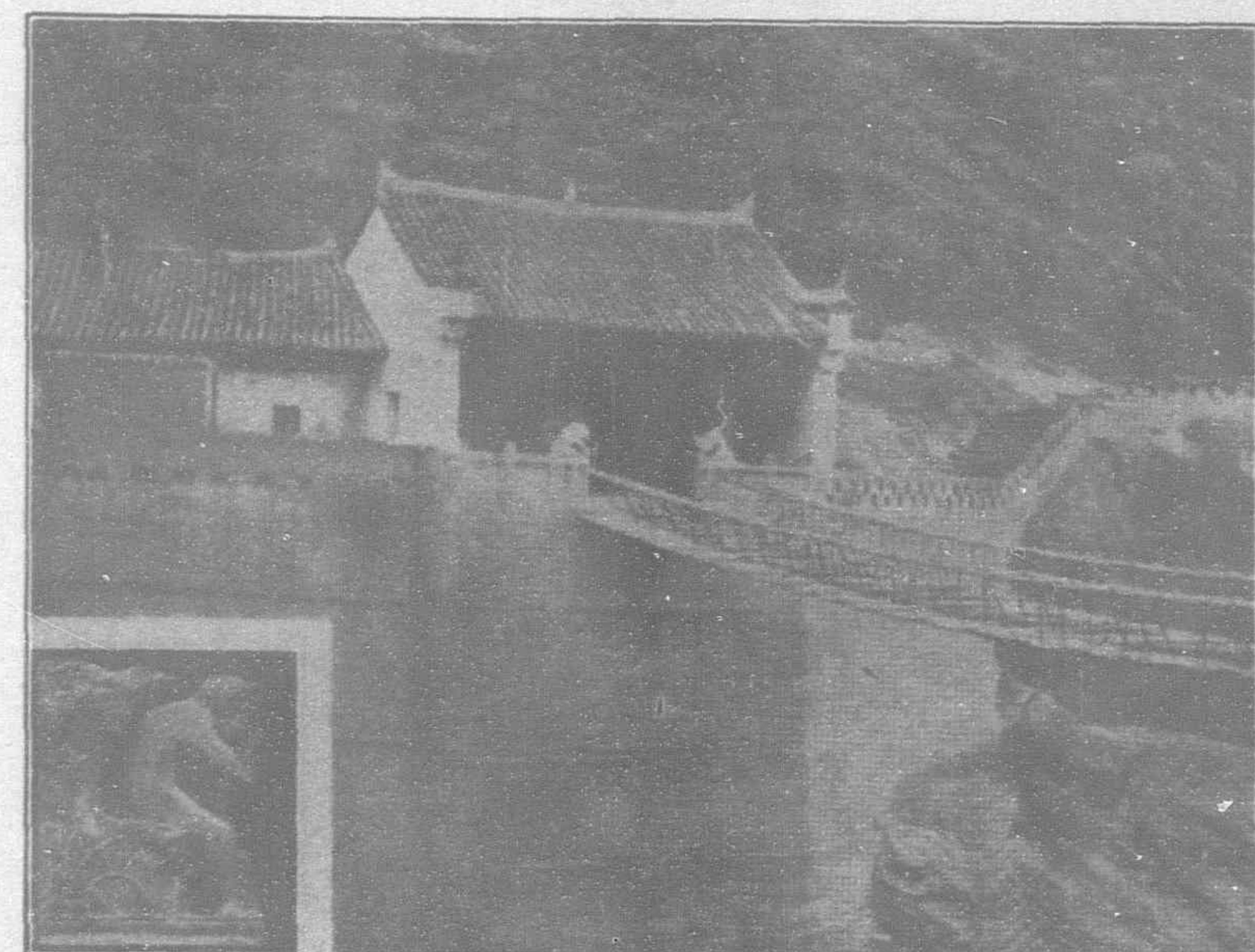


Mengtsze "Lolos"

a multitude of small placer workings operated spasmodically by the poorer inhabitants of the land along the banks of the greater rivers. The early Chinese writers mention four mines in operation about 1850, all of which seem to have been alluvial workings. Joubert, in 1867, stated that all the rivers of Yunnan carry gold, a statement which must not be taken too literally. His account of Talang T'ing gold mines appears to be the only one ever published. At the base of and on the flanks of a mountain toward the north of the city, a very folded and fractured reddish sandstone is found overlain by slightly crystalline and compact limestone, traversed by serpentine dykes, crossed by numerous narrow quartz veins. These have been opened up by very numerous shallow workings over a distance of four kilometres. Both gold and silver are irregularly

dispersed in the serpentine in the form of fine lametæ and grains; they are found in a regular manner only in the interstices of the quartz veins or other rocks which traverse or border the serpentine. After crushing to powder, the ores are concentrated in pans and rockers, and the residue is treated with mercury to separate the gold contents. Leclère seems to have been much impressed with the gold-bearing deposits of Yunnan, especially with the gravel benches and conglomerates of the Yunnanese course of the Yangtze, which is known as the Kinchachiang or "River of Golden Sands." According to Deprat, gold mines are numerous in the zone of the north and south folds of Sszechuanese Tibet, and the tributaries of the Yangtze, such as the Yalung, coming from this region, carry gold into the parent river where it is found in the recent terraces or in the actual bed.

It is beyond question that the sands of the present river beds and of the raised terraces in the upper courses of the Salween, Mekong and Yangtze carry gold. Every traveller who has been in those parts of Yunnan has commented on the fact. Among others, Dr. Logan Jack, Major Davies and the Swedish missionary Amundsen may be mentioned. Both the latter believe that the Mili country is rich in gold. This region is situated in and about the junction of the Litang with the Yalung. The state seems to be entirely Tibetan, and Mili itself, which is only about 20 miles beyond the Yunnan border, near the second bend of the Yangtze, is described as practically nothing but a big monastery. The amateur opinion of Amundsen and Davies have been confirmed by specialists like Mr. H. W. L. Way, who wrote in *The Mining Magazine* in July, 1916, as follows: "From the Chienchang valley through which flows the An Ning river on the east, to the Tibetan frontier on the west, and from Tachienlu on the north to the Kinsha (Yangtze) on the south, there is a stretch of country that is without doubt richer in mineral wealth than any other part of China, and one of the most highly mineralized spots in the whole world. This is a region of great disturbance geologically, and it is full of lodes and veins carrying gold and metallic ores. The streams and rivers contain many deposits of alluvial gold. Evidences of mining activity are seen on all sides, and mule trains are seen carrying copper matte and metal, lead bullion, iron, and other metals. The lodes are worked in a primitive way in the oxidized zones by the aboriginal tribes under the supervision of Chinese. The sulphides are left behind as too refractory." Mr. Way then describes the Maha gold mine and gives a long list of known mineral occurrences. It is only 40 or 50 miles as the crow flies from Maha to Kulu, where Davies was treated with suspicion, as the lamas thought that he had come to dig for gold. It is a much shorter distance to the borders of "Huang Lama Tifang," as the Chinese call Mili. There are strong reasons for thinking that the geological structure is much the same across the



The Kiangti Bridge across the Niulan, Decorated with Bridge Monkeys

whole region, and the fact that the western part of it is inhabited by a more or less independent race, unfriendly to the Chinese, may well have prevented its mineral resources from becoming better known.

Native placer workings are carried on all along the Yunnan course of the Yangtze. I have seen them myself around Chin-chiangkai, and from Machang to the junction of the Yalung with the Yangtze. At the former place, which is three stages to the north east of Tali Fu, the gravels in the present river bed were being washed by tribes-people in the employment of the local Chinese. Further down stream the auriferous ground was won from shallow drifts into the high-level alluvium. Around Hsinkai, the river terraces are pierced in many places by these old excavations.

Near Alushih, a small town 20 miles north of Shunning Fu, gold washing was being actively carried on in a raised terrace deposit of a small tributary of the Yangpi Ho, itself an affluent of the Mekong. The gold obtained was coarse and did not appear to have travelled far. It was probably derived from veins traversing the old slates of the vicinity. The deposit was not a large one, but interesting as showing another type distinct from the bigger ones in the rivers of northern Yunnan.

To be concluded.

Bamboo for Paper Making

The current number of the *Bulletin* of the Imperial Institute, London, contains a comprehensive and valuable article on the utilization of bamboo for paper-making. Bamboo has come much to the front in this connection during the last year or two, and it seems likely that in the near future the manufacture of paper from this material will be undertaken on a large scale in several countries. A British firm have been granted a concession for cutting bamboo in the government forests in Trinidad and have also established a bamboo plantation there of 1,000 acres. Leases have been granted or applied for, for working bamboo forests in Burma, Madras, and other parts of India. In Indo-China, two factories equipped on up-to-date lines, are actually manufacturing paper chiefly from bamboo. Paper made entirely from bamboo pulp is of high-class quality. On the whole it is too good for the manufacture of ordinary news-print and is more suitable for the better grades of printing paper. The article gives an account of the general characters and distribution of bamboos and a detailed statement as to their occurrence and utilization in various countries. The technical side of the subject is fully dealt with, particulars being given of the various methods which have been employed for the conversion of bamboo into paper-pulp.



Where comes the Railroad comes Civilization

Hongkong's Huge Contract

IMAGINE for a moment Hongkong's "Finest Site" surrounded by a solid column of earth rising nearly a mile into the air and you will have some conception of the amount of soil to be torn from Morrison Hill and thrown into the harbor under the Praya East reclamation scheme—the most costly venture yet fathered by the local public works department, Tytam reservoir and the harbour of refuge works not excepted, says the *China Mail*. A hill of 3,300,000 cubic yards is to be demolished and its place taken by flat roads and recreation grounds. A watery waste of ninety acres is to be reclaimed, sea walls and piers built, the area to be divided into blocks suitable for broad thoroughfares, modern godowns and tenements. Existing streets are to be widened or straightened, elaborate drainage works are to be constructed, and many other desirable ends achieved. Light railways are to be laid and temporary drains constructed, and by either one of two ingenious expedients, the traffic arteries passing between Morrison Hill and the existing foreshore are to be left as free from external interference as they are to-day. For six years the work of throwing a hill into the harbor will progress unceasingly. One of the first steps will be to commence work on the huge sea wall planned to start at both ends simultaneously, while the temporary drainage works will speedily give way to more permanent works.

Plans have been completed to the minutest detail (though the method of transport over or under Queen's Road East has not yet quite been determined) and tenders have been called for "reclaiming approximately 90 acres of the Praya East foreshore with materials obtained by cutting down Morrison Hill; protecting the area so reclaimed by sea and quay walls, constructing sewers, stormwater drains, reinforced concrete piers, a refuse boat pier, retaining walls and temporary and miscellaneous works." Tenders close at the colonial secretary's office at noon on June 15, 1921, and it is reasonable to assume that the contract will be let by the middle of the following month. It is understood that the period allowed the contractor to complete the work is six years, as little, if any, of the necessary plant is in the colony at the moment, but it is felt that the work might quite possibly be finished within five years' time. Alterations to the existing drainage system in the area affected are not included in the scope of the tenders now advertised.

The total estimated cost of the scheme to those participating, including drainage works on or incidental to the reclamation, water mains, forming and surfacing of roads, the construction of piers in place of the existing piers which are to be destroyed, supervision, and various other charges, amounts to \$3,385,000. The cost per square foot of the area available for appropriation—2,249,000 square feet—is therefore estimated at \$1.50 1/2. Adding a premium of 25 cents a square foot, the estimated cost to the lot owner amounts to \$1.75 1/2 per square foot. The exact area of land available under the scheme when the reclamation work has been completed will be 87.72 acres, of which 51.63 will be available for appropriation. The remaining 36.09 acres will be divided into roads. Stretching from the Royal Naval Arsenal Yard to the Sugar Refinery at East Point, the reclaimed land will have a minimum width of 600 feet and a maximum of 950 feet (both approximate figures). The area is divided into blocks. With a width of 275 feet, those nearest the foreshore will be admirably suited to the building of godowns, while the more narrow inner blocks (125 feet wide) will be more suitable for the erection of tenements.

Naturally, an important part of the work will be the new sea wall on which it is planned to commence from both ends simultaneously. At the western end a quay wall 235 feet in length providing a depth alongside of 16 feet 4 inches at low water, will be constructed for the admiralty. The remaining stretch to East Point will be

protected by the usual sea wall (similar to that in Connaught Road Central), roughly 4,935 feet long. This sea wall—from the new alignment of Arsenal Street to the Sugar Refinery—will be so designed that ships will not be able to come alongside except at piers, though, of course, the usual mooring rings will be provided for junks. The existing piers, of course, will be destroyed and their places taken by public piers—one 35 feet 4 inches wide and 120 feet 8 inches long; and the other T-shaped, 21 feet and 4 inches and 41 feet and 2 inches wide, by 40 feet long. The refuse boat pier (cement concrete block construction) will be 63 feet wide and 58 feet long, providing a depth of water alongside of 15 feet 2 inches at low water. The refuse storage shed, 32 feet 6 inches wide by 58 feet long, will be constructed on new lines. Unlike the present open sheds which allow flies to come and go at will, the new shed will be covered in. Furthermore, the doors facing the harbour will hinge downwards to act as chutes for the discharge of refuse into the waiting barges.

One of the most notable features of the scheme is the generous provision made for roads, none of which will be less than 75 feet in width, while the main east and west road will be 100 feet wide—the same width as Nathan Road, Kowloon, and twice the width of Des Vœux Road in the city. In order that this new main thoroughfare may start at the entrance to the Royal Naval Arsenal Yard, thus eliminating an awkward turning, an exchange of land will be effected with the admiralty and the property known as the Blue Buildings will be resumed and partly demolished.

A Handsome Thoroughfare

The new road, which should make a handsome thoroughfare when completed, will continue along the reclamation and rejoin Praya East at Malory Street. From Malory Street to East Point the 100-foot road will be preserved by widening the existing praya, and that portion of the existing praya roadway extending from Gresson Street to Malory Street will be widened to 75 feet. The thought of a splendid 100-foot road is not complete without many things, such as broad footpaths and trees, also trams. It may, however, be some little time before trams are seen on the new thoroughfare. The matter rests, not with the government, but with the Tramway Company. The average life of a tramline is 15 years. The Tramway Company has just reconstructed the track through this district, and it does not seem probable that they will relay it elsewhere until they have had a full return on the recent expenditure.

As already mentioned, the material for the reclamation will be obtained by demolishing Morrison Hill which will provide almost, if not quite, sufficient soil for the purpose when reduced at the centre to a height barely $3\frac{1}{2}$ feet above the level of the existing praya.

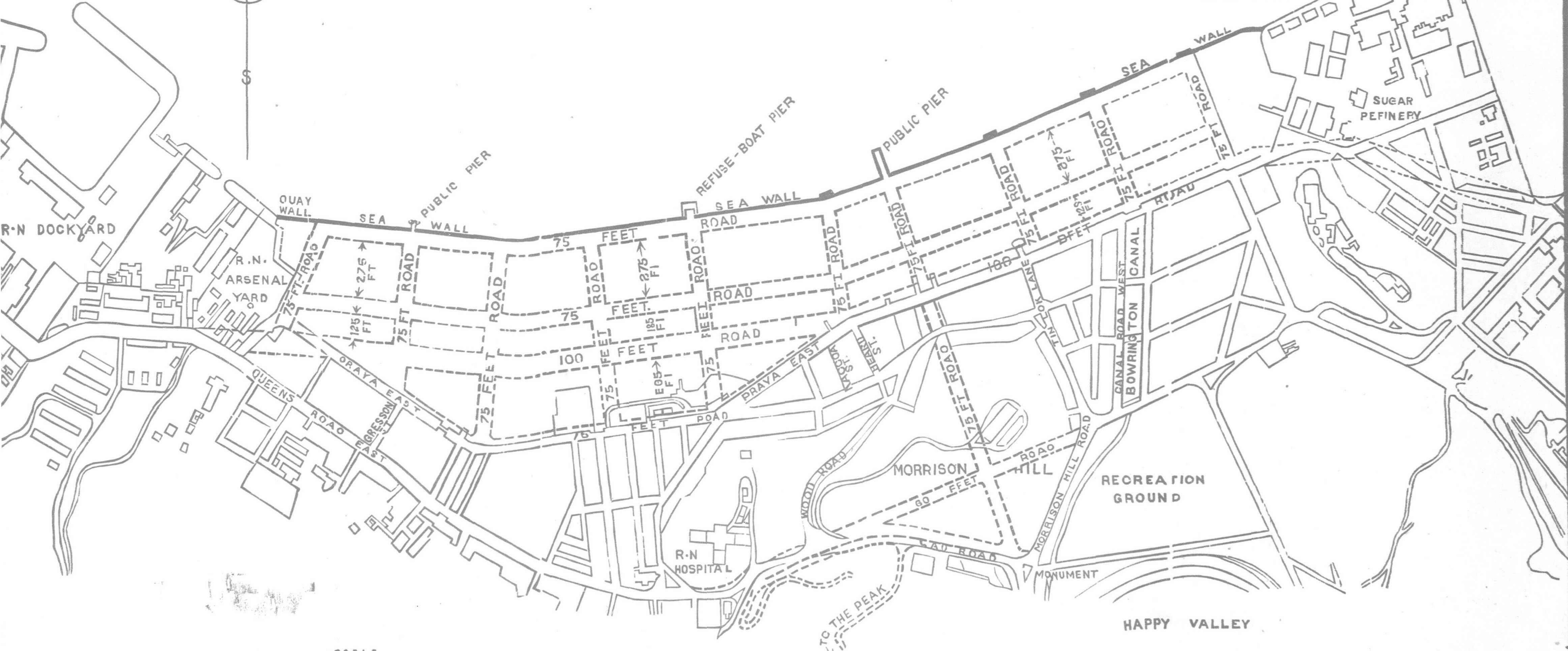
This means that the centre of Morrison Hill will be lowered $175\frac{1}{2}$ feet (from 192 to 16.50 feet above low water), and that the total quantity of filling material to be transported to the reclamation works will be 3,300,000 cubic yards.

Under the Morrison Hill development scheme one through road 75 feet wide will be made extending from the Happy Valley Monument to the new foreshore, crossing the existing Praya East at right-angles between Heard Street and Tinlok Lane. At right angles to that road there will be an extension of Queen's Road East sixty feet wide to join Leighton Hill Road near the Police recreation ground. Entrance to the road to the Peak will be made at the western end opposite the present Royal Naval Hospital entrance. It will be possible to go along the new low road to Leighton Hill Road, or to the Monument at Happy Valley, or enter the road to the Peak. It will also be possible to join the Peak Road

PRAYA EAST RECLAMATION SCHEME

HONCKONG.

(3RD MAY 1920)



from the Valley Monument end. This approach road to the Peak Road will be made at a maximum height of thirty feet above the low road in continuation of Queen's Road East.

After making provision for an extension of the recreation ground at Happy Valley by the inclusion of the triangular area on the east side of the new 75-foot road, there will remain 722,000 square feet of land. Of this area, land aggregating 397,000 square feet (9½ acres) will be available for building. It is gathered that the intention is that Morrison Hill Road from its present junction with Leighton Hill Road to Wongneichong Road at the Valley Monument will form part of the new recreation area and that the present tramway services will pass along the new 75-foot road leading to the praya.

Under the scheme, Bowrington Canal will be filled in and the existing open nullah, which at present discharges into the canal, will be replaced by massive twin concrete culverts, which will be built under the new road leading from the Happy Valley grandstand enclosure to the new harbor frontage. These two large culverts which will carry the drainage of Wongneichong to the harbor, will have a total width at the base of 32 feet and a height of twelve feet. Immediately they are ready for use Bowrington canal will be filled in. As already mentioned, the alteration of existing drainage is not included in the contract for which tenders have now been called, and it is understood that arrangements have been made for this work to be carried out separately in order that the work of the main contract will not be impeded, as it will be necessary to reconstruct the existing drainage system because the whole of the Wanchai drainage system is at a level too low to give sufficient fall for efficient discharge into the harbor at the distance it would be from the new sea-wall. Accordingly, arrangements have been made for intercepting the existing drainage until the Wanchai system has been reconstructed at a higher level. Until the big culverts are in use two, or perhaps three, "turnouts" or open intercepting sewers, will be provided. Free for reclamation work, the existing foreshore, will soon be covered up. Incidentally, the existing foreshore, which has been known to emit offensive smells at low tide, will be rendered less disagreeable while the work of reclamation is in progress, thanks to these open sewers.

An Awkward Question

How is a hill to be demolished, transported across several streets, and then dumped into the harbor? Given the necessary plant and labor the first and last portions of the question present no insuperable difficulties. Not so the question of transport. In the contract for which tenders have been called, provision is made, it is understood, for contractors to tender so far as the material obtained by the demolition of Morrison Hill is concerned, for the following alternative modes of transport:—(a) The whole by proposed transport lines under Bowrington canal bridge, Praya East; (b) the whole by overhead transport lines between Hard Street and Tinlok Lane; (c) partly by (a) and partly by (b); and (d) the whole by such other method as the contractor tendering may desire to adopt, full details of which he is requested to submit with his tender. It is distinctly made clear that the whole of the filling material shall be transported without crossing Praya East on the level so that there will be no interruption to traffic. In the unlikely event of the overhead method meeting with final favor, it is definitely stipulated that a minimum headroom of 18 feet must be provided above the level of the tramway service. Consequently in any event there will be no interruption in the traffic on Praya East.

The Brain on the Scheme

The most feasible proposal seems to be that made by Mr. John Duncan, A.M.I.C.E., public works department executive engineer, whose resourceful brain has directed the preparation of all plans, surveys, and soundings connected with the scheme—indeed, it might be said with justice that Mr. Duncan is the guiding genius of the whole scheme, so great the thought and skill he has devoted to making it a practical reality. As "the engineer

in charge of the Praya East Reclamation Works" (not by any means his only harbor work, great though it is), Mr. Duncan originated the plan for transporting the Morrison Hill material under Bowrington Canal bridge. The track lines, it is planned, will leave the hill by crossing Morrison Hill Road opposite the Police Club. They will then pass along the Canal Road west. Half-way along they will branch off into the canal and pass under the bridge between the west pier and the west abutment and so to the field of reclamation. This scheme, at first sight so simple, raised one little awkward problem. As there is not sufficient headroom between the level of high tides and the underside of the Bowrington Canal Bridge for the passage of a loaded truck and as the bridge cannot be raised without serious interruption to the low level tramway service it has been arranged to construct the transport lines in a concrete trough three feet below high water. The drainage of the canal will discharge through the remaining two spans of the bridge. Consequently trucks will be trailed to the head of the incline passing under the bridge, released by the locomotive on the shore side and seized by another locomotive waiting on the harbor side of the bridge. In this way the whole of the material can be transported from Morrison Hill to the reclamation area with the maximum of efficiency and economy and the minimum of danger to those engaged in the work and the public alike. Furthermore, the moment work is completed on the big culverts under the new road leading to the foreshore the waters can be permanently diverted, as intended under the scheme. Locomotives will not pass under the bridge, but there will be ample room for the passage of loaded trucks, as the line will drop one in 130 and rise the other side at a similar incline. The lowest portion of the line will be at a level of 6 feet above low water, but as the tide will rise to nine feet above low water, a portion of the line will actually be below sea level for a time of the day. Scientific shunting on both sides of the bridge will ensure that the trucks are handled with the minimum of delay.

The advantages of the scheme, direct and indirect, are many. Of the latter a notable instance is the practical certitude that the new 100-foot road, which is such a prominent feature of the project, will some day be connected up with Causeway Bay and the new wide road leading to Shaukiwan. Time alone can tell the ultimate benefits that the project will bring in its train. For the moment we stand waiting for the first ring of the hammer that will proclaim the great work has begun.

The Chartered Bank of India, Australia & China

At the sixty-seventh ordinary general meeting of the shareholders of the Chartered Bank of India, Australia and China held in London on the 8th of April the Chairman, Sir Montagu Cornish Turner, in speaking of the future course of Eastern trade said, "It is dangerous even in normal times to attempt to forecast the course of events, and to essay to do so now, under present abnormal world conditions, would be more dangerous still; but it may not be imprudent to state that, judging from cables reaching us this week from our respective agencies and branches, the outlook in the East is much happier, and that indications from the several spheres point to a distinctly better undertone, which we hope will, in the course of time, develop."

Later, Sir Montagu Cornish Turner said, "You will be asked to-day to confirm the election of Sir John Jordan, G.C.I.E., to a seat on the board. Sir John has had an extraordinary period of service in China from 1876 to 1920, and for the past fourteen years filled the position of British envoy extraordinary and minister plenipotentiary with great honor to himself and with great advantage to the British empire. By his tact, his diplomacy and his genial nature, Sir John Jordan has won a name for himself amongst official and non-official Chinese which will never be forgotten."

The capital of the Bank has been increased from £1,220,000 to £3,000,000 and the reserve fund now stands at £3,500,000.

Engineering Notes from the Outports

Maritime Customs Reports

NEWCHWANG

LIAO RIVER CONSERVANCY.—The works under the control of lower conservancy are the deepening of the bar by the construction of training banks and dredging, the closing of the east and west channels, and the protection of Duck Island Bend. The closing of the west channel, some six miles below Newchwang, was the first work undertaken. It was desired to direct on to the bar, and thus obtain full advantage of its scouring effect, the immense volume of water that had hitherto escaped by this channel, which exceeded a mile in width with from 6 to 10 feet of water at low tide. This channel was effectually closed by the end of 1916 and only now requires maintenance from time to time. The next work taken in hand was the east training bank, similar in construction to that across the west channel but of greater length, being six miles long and at places 22 feet deep at half-tide. The work on the lower river section is being pressed on rapidly; some 20,000 feet of the east training wall have now been completed, and, as the plant ordered is now delivered, increased progress should ensue. Dur-

ing the year the east training wall has been continued seaward for a distance of about 4,500 feet, and its entire length, 20,000 feet, has been raised from a level of 85 to 89 above Newchwang datum, *i.e.*, 4 feet. By the spring of 1922 it is hoped to have a powerful suction dredger at work on the bar, which, in conjunction with the training walls, will it is anticipated, give a 26 feet depth available across the bar at ordinary high water and thus make the port of Newchwang (Yingkow) accessible to ocean shipping. There is now a good navigable channel from inside the present outer extremity of the training walls to above Newchwang giving a depth of 28 feet at ordinary high tides, and the bar crossing is showing great alterations and improvements. Since 1919 a total scour of 1,500,000 *fang* of soil is shown to have taken place over the area of the bar surveyed, *viz.*, 11,000 feet wide. If the present rate of scour

remained constant, it would, the engineer avers, take seven years to effect the required depth by scour alone; whereas with the addition of a suitable dredger it would be possible to obtain a depth of 26 feet at high water over a channel 500 feet wide from the sea to above Newchwang.

LUNGKOW

With the approval of the government, a site for a new town on modern and fairly extensive lines has been purchased and laid

out. A handsome reinforced concrete pier has been built, the channel to which will be improved by dredging as soon as weather permits in the coming spring. This pier has been connected with the old town by a narrow-gauge railway for the haulage of cargo and by a wide carriage road. A godown has been erected near the pier for the storage of cargo; and, within the limits of the new town but conveniently near the old, an electric light works is under construction. By carrying out these public works the new Settlement Development Company have contributed their full share towards promoting, or preparing the way for, the welfare of the port—an effort as comprehensive as could be undertaken by a small body of the public, but ineffectual without a railway to back up the scheme. It is not, then, to be wondered at that the great interest aroused by the inception of these operations began to flag when the construction of the much-looked-for railway was deferred indefinitely; but that interest has been aroused again by the hurried building, within the last month or so, of the new motor road from Weihsien. This road should be completed as far as Lungkow by February. Though the improved communication

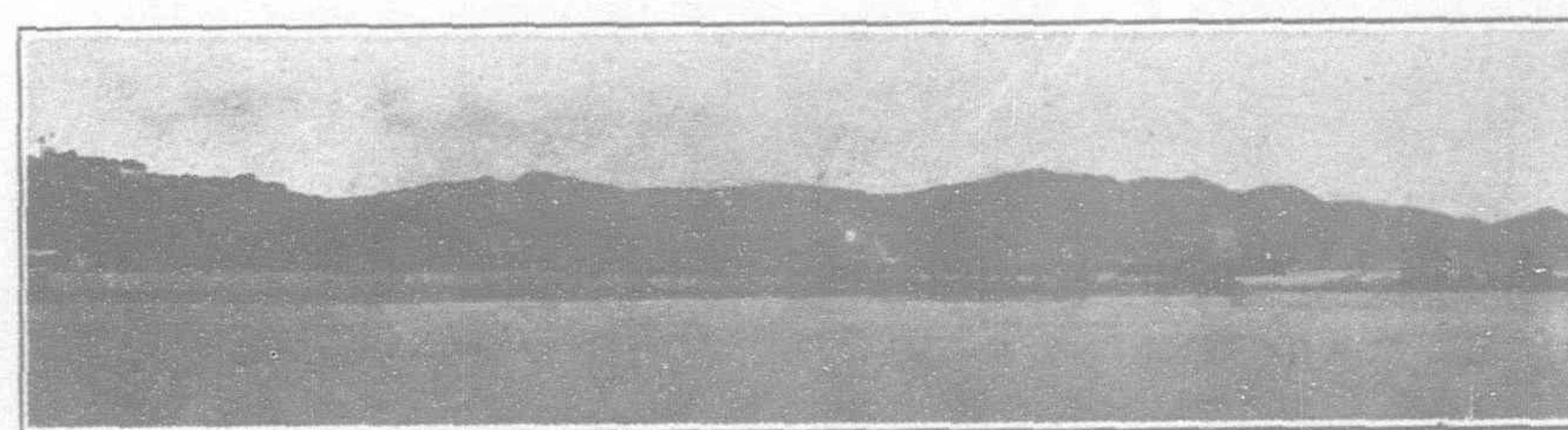


River Liao at Yingkow

thus afforded may in itself make a marked difference to the trade returns of the port for 1921, the making of this road introduces a point of far greater import, and that is the possibility of the road being converted into a railway—the stations along its route are being designed with that in view,—thus giving to the port, far sooner than could have been expected a few months ago, the one thing needful to ensure its future prosperity.

CHEFOO

HARBOR IMPROVEMENT WORK.—The report of the Commission's engineer-in-chief for the year is as follows: "Breakwater.—Throughout the year work was continued steadily. The north caisson was successfully placed in position on the 29th May and was rapidly filled with concrete. The last large blocks were set on the 10th June, and work on

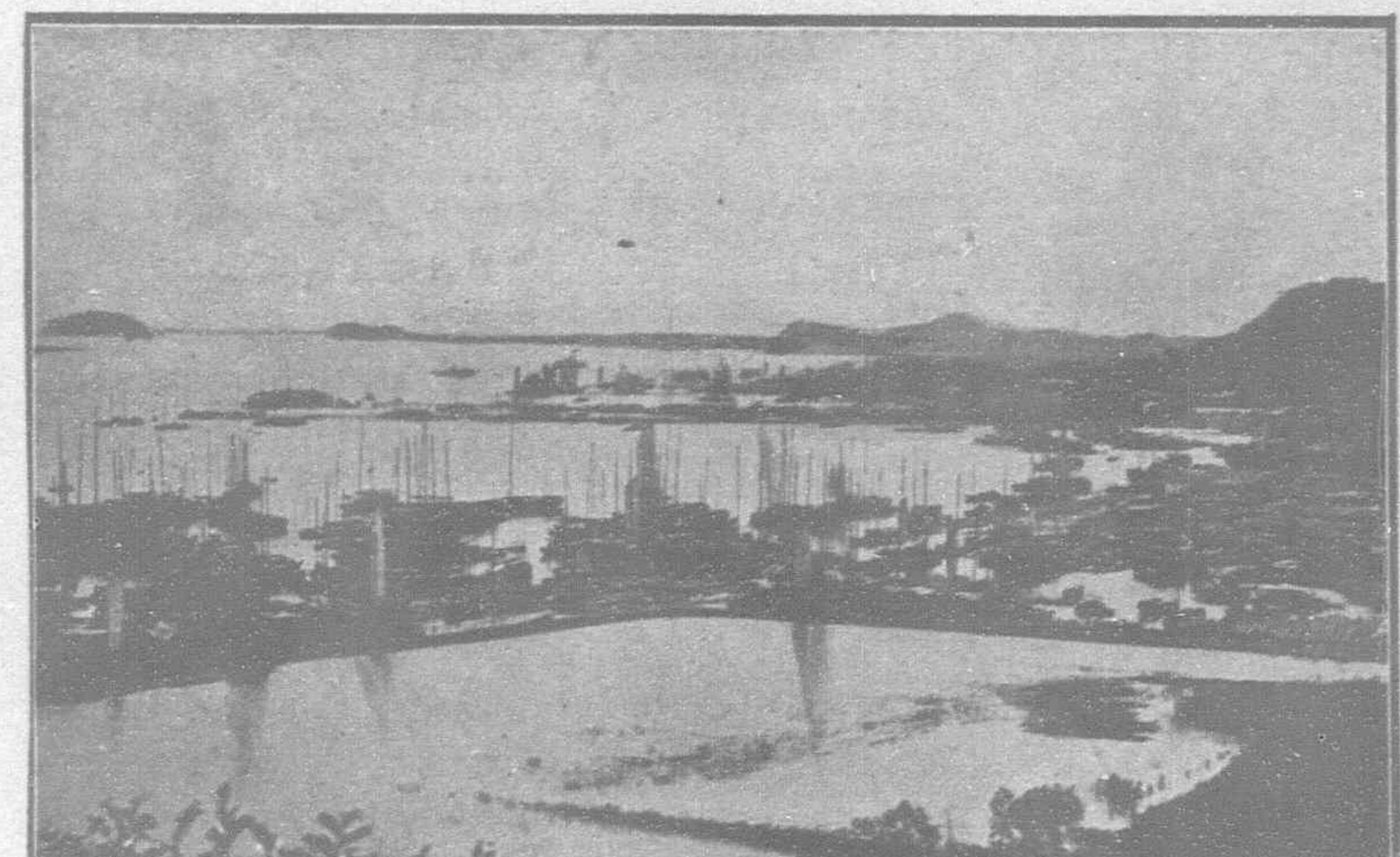


Chefoo Breakwater (now completed)

the masonry superstructure and the depositing of heavy rubble and small blocks on the berms were carried on without interruption. The whole of the work on the breakwater was completed by the beginning of December. *Mole.*—Work has been carried on steadily from the 1st March to the 30th December. To date, some 1,194,000 cubic yards of sand, 167,000 square yards of brushwood zinkstuk, and 64,500 tons of rubble have been deposited in the foundations and lower part of the mole and nearly 173,000 tons of rubble of various grades in the upper part. The mound is approximately to its full height, and protected by



Nanking, on the Yangtze



View of Chinkiang Anchorage. One of the Principal Cities in the Export of Groundnuts

heavy rubble on the slopes for a length of about 3,200 feet. A total length of 1,700 feet of parapet wall has been built. The reinforced concrete caisson for the east end of the quay wall was successfully sunk on the 1st August and has been filled with concrete, and all the large masonry blocks in the quay wall and wing walls has been set, and about half of the masonry superstructure has been built. Since the commencement of the works 18,000 tons of cement have been received." The difficulty in quarrying was again the main source of delay. The contractors set up a compressed plant for drilling; that it was a failure was ascribed to the quality of the drills; but after further expert experiment in the winter it is reported that the poor results were due to want of experience in running the plant. It had been fully expected that the works would be completed in November, but at the moment of writing it is doubtful whether they will not run into 1922. The protection given to shipping is already great. As a measure of famine relief, a mud road is being constructed from Weihaiwei. It will be suitable for motor-trucks, except in bad weather; so, if kept up, the value of the harbor works will be appreciated. Foreigners there are endeavoring to have other roads built round Chefoo, and were willing to pay an extra surtax for such roads to be constructed by the harbor commission, but the plan is at present not in favor with the local Chinese. Roads would, however, bring far more trade to the port than the proposed Weihsien Railway.

HUNCHUN

An experiment was made in July by a group of Chinese merchants to light the town with electricity. It proved a failure, and better machinery was about to be contracted for with a British firm in Vladivostok when the *hung-hu-tzu* raided the place. The new venture was thus nipped in the bud.

SOOCHOW

Several new commercial ventures started during the year. In March the erection of a large cardboard manufactory, the first of its kind in China, was commenced on the bank of the Grand Canal, to the west of the Ch'ang Men. During the summer an extensive match factory was built—the Hung Sheng Huo Ch'ai Kung Ssu with a capital of Tls. 120,000. This plant is on the bank of the Canal, outside the Hsu Men, and belongs to a Shanghai syndicate. It started work in December, and produces daily 40 boxes of 50 gross. Another match manufactory is also in course of construction. A new electric light company, styled the Soochow Electricity Works, commenced in October to erect poles in the principal streets. The new company is reported to have

the support of the gentry, and is opposed to the old company, on account of having disposed of part of their interests to Japanese capitalists.—In October a Kiangsu-Chekiang Taihu conservancy office was opened inside the Hsu Men.

NANKING

Large areas of low-lying land continue to be filled in at Hsiakwan and building operations have been very active. Near the new bund the Electric Light Company has erected a branch power-station, and the Chinese firm of Shun Ho & Co. has established at Hsiakwan a wharf and coal yards for handling the Kailan Mining Administration's coal.

HANGCHOW

The model factory for the finishing of woven textiles, established by the provincial authorities, was scarcely a year old when it had to be closed; it has passed into the hands of the Silk Guild, together with the whole of the machinery; and the provincial Mint, after being out of commission for many years, now occupies the buildings and has begun to issue dollars of the Yuan Shih-k'ai pattern. The steam-dredger has been constantly at work keeping the West Lake free from weeds and silt; but, while such conserving operations deserve commendation, the erection in that supremely picturesque spot of vilely designed foreign-style buildings produces a feeling of protest in the minds of those who, decades ago, saw the famous West Lake in its unspoilt pristine beauty.—The Standard Oil Company built an oil installation of 40,000 gallons capacity at Kashing.

NINGPO

No new construction was carried out during the year on the Shanghai-Hangchow-Ningpo Railway, which still stops short at Tsao-o, nor has anything definite been arranged in regard to the extension of the line to Hangchow. According to figures courteously supplied by the company, 1,299,672 passengers and 75,868 tons of freight were carried on the Ningpo-Tsao-o section during 1920, a decrease in each case of about 5 per cent. compared with the returns for the preceding year.—The profits of the Ho Feng Cotton-spinning Factory again surpassed \$1,000,000. The company was started in 1904 with a paid-up capital of \$600,000, divided into 6,000 shares of \$100 each. The capital was increased to \$900,000 in 1916. The factory occupies about 30 acres of land on the Kiangtung side of the river, opposite the Custom House. For the past two years it has been running day and night, with scarcely any intermission. The number of hands

employed is 2,500, and the following is the wages table per day:—

Skilled labor (e.g., foremen):—

		MINIMUM	MAXIMUM
Men	...	\$0.35	\$0.60
Women	...	0.30	0.50
Ordinary labor:—			
Men	...	0.30	0.50
Women	...	0.20	0.30
Boys (aged about 15 years)	...	0.20	0.30
Girls	„ „ „	0.10	0.20
Small boys (aged about 10 years)	...	0.10	0.20
„ girls	„ „ „	0.07	0.10

Most of the cotton used is produced locally, and the factory is able to turn out about 7,000 piculs monthly of coarse yarn, chiefly No. 10. With the raw product at their doors, an abundant and absurdly cheap labor supply to draw on, and no vexatious factory laws to observe, it is not surprising that their annual profits should have exceeded their total capital on at least three occasions.—Mention has been made above of the hand-weaving factories at Chinhai. These are the Kung Yi and Chen Yi Cloth-weaving Companies. The former concern has been in operation for more than 10 years; the latter was established in 1916. They each started with a capital of \$30,000 and are equipped with 250 and 200 wooden hand-looms respectively, besides a certain number of old-style spinning-wheels for winding the yarn. The two undertakings together employ about 600 hands, chiefly women and children, who work from dawn to dark and are paid by results. On a normal day a woman can weave a piece of cloth 20 feet long and 2 feet wide, earning thereby 160 cash, which is equivalent to nearly \$0.12: whilst a child can wind 100 spindles of yarn, for which he will be paid 100 cash, or \$0.07. Both of these companies are reported to have made considerable profits during the past few years.

KIUKIANG

The Yu Sung Match Factory, with a capital of \$250,000, promoted by Mr. King Hao-yu, was completed during the course of the year. The factory covers an area of 18 *mow* and employs about 400 hands, men and women. The daily output is from 50 to 60 chests, each containing 50 gross of small-size non-safety matches of inferior quality for consumption in the interior. All the materials required for the manufacture of the matches are imported from Japan.—The gross receipts of the Nan-Hsun Railway for the year totalled about \$600,000, whilst the total expenditure, including interest on loans, amounted to \$800,000. The rolling-stock, permanent way, and bridges are in a bad state of disrepair and will entail a very heavy outlay in the near future if the line is to continue working. A short-term loan of \$400,000 was contracted with the Bank of Taiwan and another of \$20,000 with the Bank of Communications to meet outstanding obligations and pay the salaries of the staff, which had been three months in arrears. Mismanagement and corruption are rampant, and the company is so heavily in debt to the Japanese that sooner or later these creditors will take over the running of the line, with a possibility of extending it to Kwangtung and Fukien, as once planned by them, thus enabling it to pay its way.—The development of Pinchingchow referred to in the 1917, 1918 and 1919 reports, has been arrested by the squandering of all the funds; most of the principal roads are marked out, but no attempt has been made either to drain or pave them. The land is all taken up and is being rapidly built over; but it is regrettable that the laying out of the roads, etc., has had to be suspended owing to the want of funds. It promises, in the course of a few years, to become the business quarter of the city. The Kuling cable railway is still a thing of the future; the constructing engineer, who was wanted in 1919 owing to his disappearance with most of the funds, was subsequently arrested by the Shanghai police and returned to Kuling, where hopes were entertained that work would commence; but he disappeared again, to be

found later on by the Hankow police; he was rearrested and imprisoned, being subsequently let out under police supervision. His death a few days later ended all hopes of commencing work, the funds having all disappeared.

NANNING

The insistent call for housing accommodation has found a response in a quickened activity in building, which has developed and expanded locally in keeping with the times.—The Nanning Electric Light Company deserves credit for meeting, with fair success, the increased demand for lighting facilities, but, unless it is able to extend, it will be unable to keep pace with the needs of the district it serves.—The provision of a wholesome water supply for the city has been engaging the attention of the provincial authorities for a considerable time, and two artesian wells, one inside the city and one outside the East Gate, were completed during the year. Four more of these wells are being sunk, and the authorities are now within measurable distance of arriving at the completion of their scheme.—The number of motor vehicles has been increased by the arrival of four bulky motor charabancs. The road leading from Nanning *via* Wuming to Szengen, a distance of 255 *li*, is an undulating, fairly smooth prepared surface road, but the surface of most of the roads in this district is unrolled macadam, with abundant loose stones, and conditions are not yet sufficiently good and improving to warrant any great use of motor traffic.

Wolfram Prospects in Burma

THE position of the Mawchi Mines, Ltd., Burma, reflects the present condition of the wolfram industry. The company's stock of mixed tin-wolfram concentrate in that country has been accumulating, until in January the amount was 939 tons. In addition, there are 123 tons of separated tin concentrate and 18 tons of tungsten powder waiting realization there. Also 473 tons of mixed concentrate is in Burma awaiting shipment. It was thought best under these circumstances to suspend output, and instructions were given accordingly on January 27. The company has borrowed £108,000 on the above-mentioned products from the bankers and others. In order to satisfy the bankers and to put finances in a better condition, the directors offered £60,000 prior lien debentures last November, and of these £25,500 have been taken up. They are now offering the remainder among debenture-holders and shareholders. Mr. C. M. Euan-Smith has recently made an examination, and in conjunction with Mr. John D. Hoffmann has submitted a report on the property. These engineers write hopefully of the future, provided market conditions improve, and are against the abandonment of the properties. The company also has a controlling interest in the Kassa Mining Co., which was recently formed to acquire properties from the Niger Company, and there is still a liability for calls. The Kassa properties have been developed on a small scale, but it is considered best to suspend active operations for the present.—*The Mining Magazine*.

NOBEL HOUSE.—The Office of Woods & Forests has given permission for the Buckingham Palace Hotel, in Buckingham Palace Road, to be known as Nobel House. The reconstruction of the hotel and its conversion into business premises for Nobel Industries, Ltd., is nearing completion. It was recently announced that Nobel's Explosives Co., Ltd., of Glasgow, a constituent company of Nobel Industries, Ltd., had decided to dispose of their Glasgow offices in view of the coming move of their staff to London.

Chinese and Japanese Bonds on the American Market

AT a time when rumors of loans fill the Celestial air and Peking cabinets rise and fall according to the ability of any one of its members to coax the wary dollar into the coffers of the treasury, it is well to stop and review the position of Far Eastern bonds in the American financial market. It is not our purpose to review at length the various attempts made in the past to obtain a substantial footing for American capital in the development of China's resources through the flotation of government loans. Sufficient to say, that after twelve years of activity, Americans cannot point to one successful American loan or concession, from which their manufacturers or merchants have derived any tangible benefit. In nearly every instance where Americans have accepted Chinese loans and concessions, they have found that the rights had previously been ceded by China to some other power.

Up to date, Americans have little to show but a collection of contracts and concessions which may be executed only by co-operating with the interests whose rights were invaded. On the other hand, we have the friendship of the Chinese. In view, however, of the keen, cut-throat competition in this market, the asset is one which cannot be safely depended upon to bring substantial returns in the face of other rationals offering lower prices, and better terms. If Americans had devoted as much time, thought and energy in originating or accepting legitimate opportunities as they did in seeking propositions involving lengthy and acrimonious diplomatic disputes, our enterprise in China would have been firmly established on an endurable basis, and a profitable market opened for our railway and engineering supplies. We wasted many years in pin-pricking the other powers in order to find out just how far they would go to uphold their favorite sphere of influence policy, and after we had tried them all and found that the door to our railway activities was hermetically closed, we now propose to co-operate with them as the one solution. The result is the consortium, which will internationalize all future Chinese government issues offered for sale in the American market.

The Chinese bonds listed on the New York Stock Exchange are confined to what are known as the "Hukwangs." In 1911 the Chinese government negotiated a loan of £6,000,000 with the old Four Power Group which was placed in equal parts on the London, Paris, Berlin and New York markets. The proceeds were applied to the construction of 1,124 miles of railways, and for the retirement of the \$2,222,000 Chinese Imperial Loan of 1900. The bonds are secured by a first charge upon certain provincial revenues netting about \$3,500,000 a year in amount and the revenues of the railways. These bonds were quoted last year on the New York Stock Exchange as low as 57. This was due in the first place, to the fact that the loan is in pounds sterling, bearing interest in the same currency, and payable in New York at the current rate of exchange, but with the pound down to four dollars the income at the above quotation was about 7 per cent., and with exchange at normal it will be nearly 9 per cent.

One of the reasons for the low quotation of these bonds is the fact that they are not secured on the physical properties of the line itself. The original loan of \$30,000,000, which under ordinary circumstances, should have sufficed to build at least 600 miles of completed railway, has built only 200 miles whose revenues can be made to serve as security. At least half of the loan has been employed in paying interest. Add to this the repudiation by the Chinese government of the German quarter of the loan, which bonds are now largely in the hands of American, French and other investors, and we have the reason for this low quotation at this time.

In addition to the above, in 1916 China borrowed \$5,000,000 on a 6 per cent. Three Year Note secured by the Wine and Tobacco Revenues from the Continental and Commercial Trust and Savings Bank of Chicago. The price was 97½. It became due on November 1, 1919, and as China could not pay, was replaced by a Two Year Note due November 1921 bearing 6 per cent. It sold at 98.125 through the same bank. These notes are secured by Goods Taxes derived from four provinces estimated at \$4,911,692 (silver) and also by a charge upon the Wine and Tobacco Taxes, estimated to net \$14,514,992 (silver) per annum.

This represents the sum total of Chinese loans on the American market.

Japanese Government Issues

Writing in the *Magazine of Wall Street*, Mr. George S. Hammond gives the following brief and interesting resumé of Japanese government bonds quoted on the New York Stock Exchange.

"The first of the Japanese bonds to be sold here was the 4½ per cent. Sterling Loan dated March 26, 1905 and due February 15, 1925. At the time of issue, the Russo-Japanese War had not yet come to a close, but Port Arthur had surrendered the previous January, the Battle of Mukden (February 24 to March 12) had ended in a Russian defeat, and that nation had obviously lost the war. The Japanese military achievements were much more glowing than was the state of her finances. The accumulated wealth of the nation was not large enough to bear the cost of the war, and resort was made to external borrowing. This loan was originally £30,000,000 in amount, of which £15,000,000 was placed in the United States through Kuhn, Loeb & Co., the National City Bank, and the National Bank of Commerce. The balance was sold in London. It is interesting to note that although the United States took one-half of the loan, the pound sterling, long supreme in international finance, took precedence as the form of currency to be named in the bond. It was provided, however, that both principal and interest were to be payable in New York at a fixed rate of \$4.87 to the pound. In dealing on the Stock Exchange \$5 is considered as equal to £1.

"Notwithstanding the novelty of the security to American investors, it was an entire success for, at that time, capital was abundant and interest rates were extremely low. New York Central 3½s, for example, sold up to 100½ in the year 1905. The Japanese 4½s were offered at a price of 87½, to yield about 5.50 per cent. The then liberality of return led to their being snapped up very rapidly.

"The bonds are secured by a first charge upon the net revenues derived from the Japanese government tobacco monopoly, which includes complete control of all branches of production, manufacture and sale. The net profits have recently averaged about £6,000,000 annually, against a maximum interest charge on these bonds of £1,350,000. This charge is now considerably reduced, for £7,502,600, or one-fourth of the total issue, have been retired. In the slightly more than five years which the bonds still have to run, the amount will be further reduced.

"In common with the general trend of the bond market, this issue, now selling at 82 (\$820 for £200), is much below its pre-war quotations. The yield to maturity is about 8 per cent., and I think it is a safe assertion that in scarcely any other security can one find a similar return with an equal degree of safety."

A LIST OF CHINESE BANKS IN SHANGHAI

The most recent reports on the financial condition of these banks as compiled by the secretary of the Shanghai Chinese Bankers' Association, are as follows:

Bank of China—

Head Office: Peking.

Branch Offices: 1 in Pei-tung-yuen, Peking District; 7 in Chili; 20 in Manchuria; 3 in Hupeh; 1 in Hunan; 11 in Kiangsu; 6 in Shantung; 4 in Shansi; 5 in Honan; 4 in Kwantung; 4 in Fukien; 10 in Chekiang; 5 in Kiangsi; 6 in Anhuei; 4 in Kweichow; 2 in Shensi; 7 in Szechuen; 2 in Suiyuan; 2 in Chahar; 2 in Urga.

Authorized Capital	...	...	...	...	\$60,000,000
Paid-up Capital	...	...	...	...	\$12,279,800
Reserved Fund	...	...	...	...	\$ 3,197,400

Founded, 1912.

Officers of the Head Office, Peking: Mr. Feng Kun-kwang, President; Mr. Chang Cha-Ao, Vice-President.

Officers of the Shanghai Branch: Mr. Sung Han-Chong, Manager; Mr. Nien Chun-teh, Vice-Manager; Mr. Feng Chung-tsing, Assistant Manager; Mr. Sze Kiu-ao, Chief of the Business Department.

Shanghai Office: 3 Hankow Road, Shanghai.

Bank of Communications—

Head Office: Peking.

Branch Offices: 3 in Peking District; 6 in Chihli; 4 in Shantung; 8 in Honan; 3 in Shansi; 13 in Kiangsu; 1 in Kiangsi; 1 in Chekiang; 1 in Hupeh; 1 in Hunan; 1 in Szechuan; 3 in Anhuei; 12 in Manchuria; 8 in Inner-Mongolia; 1 each in Hongkong, Singapore and Tokyo.

Authorized Capital	...	...	...	...	\$15,000,000
Paid-up Capital	...	...	...	...	\$ 7,500,000
Reserved Fund	...	...	...	...	\$ 3,223,828

Founded, 1907.

Officers of the Peking Head Office: Mr. Chao Chen-tien, Manager; Mr. Chen Feng-pao, Vice-Manager.

Officers of the Shanghai Branch: Mr. Chien Hsin-chu, Manager; Mr. Wang Chen-chu, Assistant Manager.

Shanghai Office: Corner of the Bund and Hankow Road.

The National Commercial Bank, Ltd.—

Head Office: Shanghai (14 Peking Road).

Branch Offices: Hangchow, Hankow, Tientsin, Peking, Mukden and Harbin.

Authorized Capital	...	...	...	...	\$ 1,000,000
Paid-up Capital	...	...	...	...	\$ 1,000,000
Reserved Fund	...	...	...	...	\$ 430,000

Founded, 1908.

Officers of the Head Office: Mr. K. C. Yih, Director-General; Mr. Y. T. Chiang, Mr. S. S. Shun, Mr. C. T. Ho, Mr. H. L. Chow, Mr. T. S. Chang, Mr. Y. N. Koo, Managing-Directors; Messrs. S. T. Chen and F. S. Chiang, Supervisors.

Officers of the Shanghai Office: Mr. C. S. Shen, Manager; Mr. C. C. Hsu, Mr. C. M. Yang, Vice-Managers; Mr. V. J. Feng, Chief of the Business Department.

The Chekiang Industrial Bank, Ltd.—

Head Office: Hankow.

Branch Offices: Haimen, Chekiang; Lanchee, Chekiang; Shanghai.

Authorized Capital	...	...	...	...	\$ 1,000,000
Paid-up Capital	...	...	...	...	\$ 710,300
Reserved Fund	...	...	...	...	\$ 70,000

Founded, 1909.

Officers of the Shanghai Office: Mr. F. S. Li, Manager; Messrs. T. S. Chun and M. C. Shia, Assistant Managers.

Shanghai Office: 39 Peking Road.

The Shanghai Commercial and Savings Bank—

Head Office: Shanghai (9 Ningpo Road).

Branch Offices: Soochow, Wusih, Shanghai (15 North Szechuen Road).

Agents: Changchow, Nanking, Pengpu, Nantungchow, Nishien, Linwei-kwan, Hankow, Tsinan.

Authorized Capital	...	...	...	...	\$ 1,000,000
Paid-up Capital	...	...	...	...	\$ 1,000,000
Reserved Fund	...	...	...	...	\$ 96,000

Founded, 1915.

Officers of the Head Office: Messrs. L. Chong, E. C. Ling, H. S. Kung, C. Chang, H. T. Chen, Chang Chien, K. Chow, S. T. Woo, T. Yang, A. Tsai, M. Li, Directors. Mr. H. T. Chen, General Manager; Messrs. T. F. Yang, C. C. Chu and S. M. Tang, Assistant Managers

Salt Industrial Bank—

Head Office: Peking.

Branch Offices: Tientsin, Shachachong, Sinyanchow, Hankow, Nanking, Yanchow, Hongkong, Hangchow, Shanghai (10 Peking Road).	...	...	...	...	\$ 5,000,000
Authorized Capital	...	...	...	...	\$ 3,500,000
Paid-up Capital	...	...	...	...	\$ 1,600,000
Reserved Fund	...	...	...	...	...

Founded, 1914.

Officers of the Shanghai Branch: Mr. Y. F. Nieh, Manager; Y. C. Yang, Vice-Manager.

Chung Foo Union Bank—

Head Office: Tientsin.

Branch Offices: Hankow, Peking, Shanghai (441 Ningpo Road).	...	...	...	...	\$ 2,000,000
Authorized Capital	...	...	...	...	\$ 1,500,000
Paid-up Capital	...	...	...	...	\$ 124,000
Reserved Fund	...	...	...	...	...

Founded, 1915.

Officers of the Shanghai Branch: Mr. C. S. Sun, Manager; Mr. C. T. Shia, Vice-Manager.

Young Brothers' Banking Corporation—

Head Office: Chungking, Szechuan Province.

Branch Offices: Shanghai, Chengtu, Fanyuen, Ichang, Shotze, Hankow, Tientsin, Peking.	...	...	...	...	\$ 1,000,000
Authorized Capital	...	...	...	...	\$ 1,000,000
Paid-up Capital	...	...	...	...	\$ 300,000
Reserved Fund	...	...	...	...	...

Founded, 1913.

Officers of the Shanghai Branch: Mr. S. W. Keh, Manager; Messrs. Y. F. Chow and K. T. Chiang, Vice-Managers.

Shanghai Office: 4267 Honan Road.

Ningpo Commercial Bank—

Head Office: Shanghai (corner of Ningpo and Kiangsi Roads).

Branch Offices: Ningpo, Wenchow, Hankow.

Authorized Capital	...	...	...	...	Tls. 1,500,000
Paid-up Capital	...	...	...	...	Tls. 649,825
Reserved Fund	...	...	...	...	Tls. 77,387

Founded, 1908.

Officers of the Shanghai Office: Mr. H. F. Sun, General Manager; Messrs. N. H. Chen and S. L. Hsu, Managers.

Chung Hua Commercial & Saving Bank (U38 Peking Road, Shanghai)—

Head Office: Shanghai.

Authorized Capital	...	...	...	...	\$ 250,000 (paid up fully)
Founded, 1912.	...	...	...	...	...

Officers of the Head Office: Mr. S. F. Kong, Manager; Mr. T. S. Yao, Vice-Manager.

The Bank of Canton, Ltd. (2 Ningpo Road, Shanghai).

Head Office: Hongkong.

Branch Offices: Canton, Siam, Shanghai.

Authorized Capital	...	...	...	...	£ 1,000,000
Paid-up Capital	...	...	...	...	£ 697,340
Founded, 1912.	...	...	...	...	...

Officers of the Shanghai Branch: Mr. S. C. Wang, Manager.

King Chen Banking Corporation (476 Nanking Road, Shanghai)—

Head Office: Tientsin.

Branch Offices: Peking, Hankow, Pengpu, Shanghai.

Authorized Capital	...	...	...	...	\$ 5,000,000
Paid-up Capital	...	...	...	...	\$ 3,500,000
Reserved Fund	...	...	...	...	\$ 200,000
Founded, 1917.	...	...	...	...	...

Officers of the Shanghai Branch: Mr. S. Y. Tien, Manager; Mr. Y. C. Woo, Assistant Manager.

Sin Hua Savings Bank (Tientsin Road, Shanghai)—

Head Office: Peking.

Branch Offices: Shanghai, Tientsin.

Authorized Capital	...	...	...	...	\$ 5,000,000
Paid-up Capital	...	...	...	...	\$ 1,250,000
Reserved Fund	...	...	...	...	\$ 453,000
Founded, 1914.	...	...	...	...	...

Officers of the Shanghai Branch: Mr. K. H. Ling, Manager; Mr. L. S. Chen, Chief of the Business Department.

Commercial Bank of China—

Head Office: 6 The Bund, Shanghai.

Authorized Capital	...	...	...	...	Tls. 5,000,000
Paid-up Capital	...	...	...	...	Tls. 2,500,000
Reserved Fund	...	...	...	...	Tls. 1,245,000
Founded, 1897.	...	...	...	...	...

Officers of the Head Office: Mr. S. A. Fu, Manager.



Reservoir for the Water-Power Station in the Tjatoer Valley, near Madioen (Java)

Hydro-Electric Plants in the N.E.I.

SINCE 1910 the waterpower problem has been studied by the government, originally merely for the sake of electrifying the state railways, but later on a wider basis in the interest of a better supply of energy as an important factor to the industrial development of the country.

The service for waterpower and electricity is an independent subdivision of the department of government enterprises. To this new service is assigned the task of "effectually promoting an economical supply of energy to the districts, which come under consideration therefor, making efficient use of the country's waterpower for the industrial development of these colonies in general and for that of the state railways and other government industries in particular."

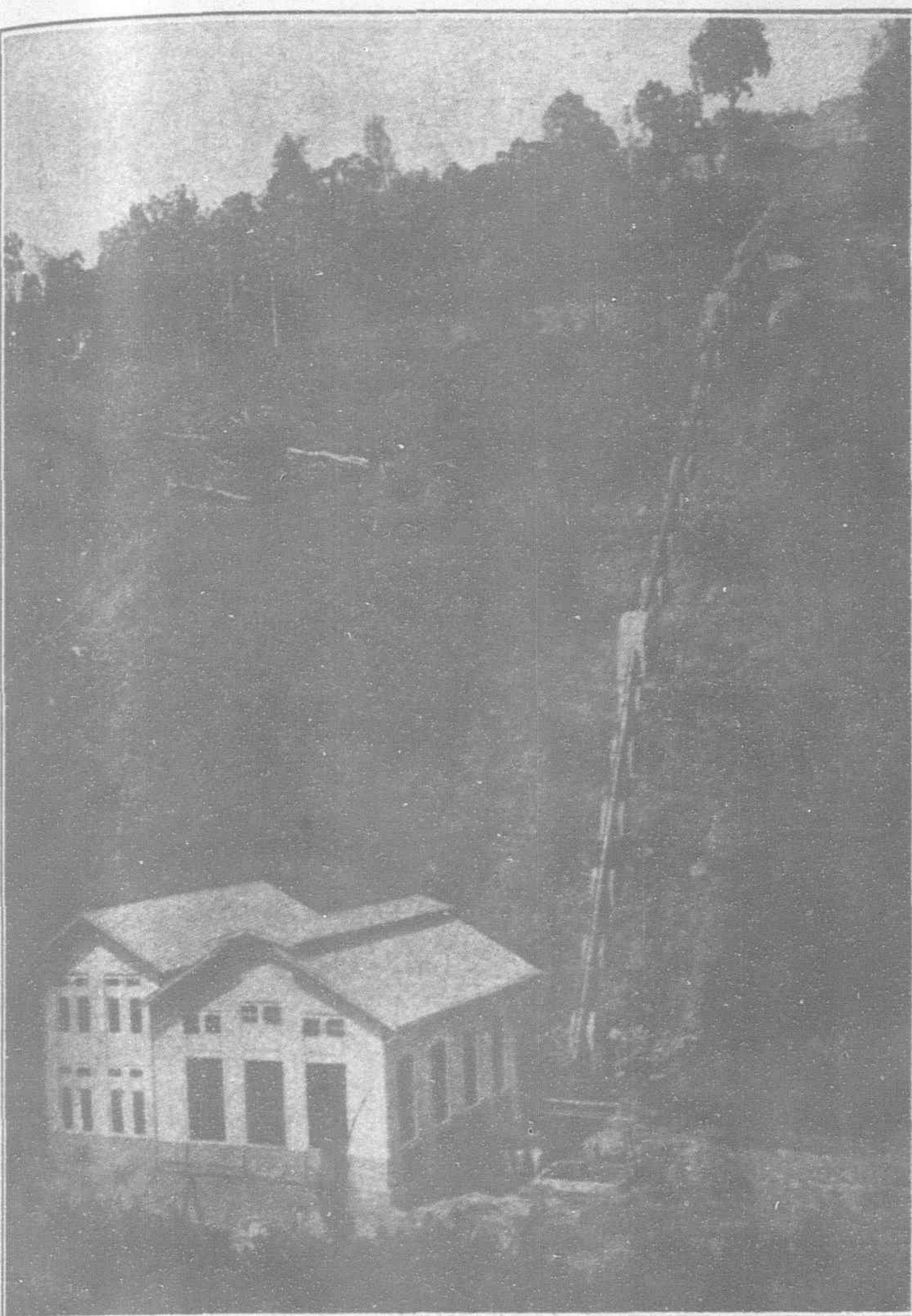
To attain this purpose the service for waterpower and electricity has charge of :

(a) the systematic investigation and exploration of valuable waterpower in those regions, where most need will be felt for this source of power;



P. A. Roelofsen, C.E.
Chief of the Government Hydro-Electric Service
and Director of Public Works

- (b) taking an inventory of the water-power discovered and giving information to those interested;
- (c) the promoting of the economical use of the great sources of power which are to be made available and the prevention of waste in the country's valuable sources of energy;
- (d) the promoting of an economical and systematic provision for the need of electrical energy and the giving of information to those interested;
- (e) the supporting and establishing of powerful electrical industries in regions, where valuable sources of power are at hand and where there is need for electrical energy, among other things by furnishing technical data and information and also by making tests and technical researches in the electro-industrial field or for the promotion of waterpower works in general;
- (f) the making up of budgets and plans, and, where necessary, the supervision of the construction of waterpower works and other im-



The Tjatoer Hydro-Electric Power House, Java

portant works in the electro-technical field, for the department of government industries or, if desired for other departments, for provinces and communities. This includes, also, the plans for the electrification of the railways and the reservation of the waterpower especially adapted for this purpose, besides making a study of the way in which provision may be made for the future need of electricity, in so far as this cannot be supplied by waterpower;

(g) the handling of matters, concerning concessions for water-power and licenses for the construction and the use of conducting wires for electric lighting and the transmission of power by means of electricity, besides seeing that the regulations referring to these concessions and licenses are carried out.

In order to make a practical division of the above task, the service has besides an administrative division, three technical departments, namely the hydro-technical, the electro-technical and the construction department, all of which are established at Bandoong. Twenty engineers are active in the service.

The department of electricity does all work of an electrical mechanical nature. This department also gives advice, particularly to local resorts, regarding subjects, which belong to its line of activity. It carries out, according to the principles, adopted by the government, the "electricity policy," the object of which is to lead up to the supplying of electrical energy in the Dutch East-Indies in as rational a way as possible, and in this connection handles all incoming requests for licenses to establish local electrical industries.

It is the task of the department of construction to carry out all work to be done by the service.

The hydro-technical department has charge of all remaining activities. In the first place the systematic research for water-power, by the studying of maps as well as by field exploration and water gauging. For this purpose water observation posts have been established in rivers and lakes, to the number of 30 in Java and 10 in the outlying possessions (Sumatra and Celebes), which posts are being continually increased. Many of these posts are provided with self-registering level-gauges. The water gauging is done with electrical gauge instruments. The figures obtained daily will be regularly published as a sub-division of the so-called waterpower cadastre. In this cadastre will also be included all data regarding location and power of waterpower sources, those which have not yet been utilized as well as those which are already partly or entirely in use. Waterpower concessions and licenses already granted will also be registered in this cadastre. This waterpower cadastre is open to the public; private individuals wishing to make use of waterpower may learn beforehand what is already known concerning the rivers or aqueducts which they have in view.

The force of the waterpower located by the government in Java, Sumatra and Celebes, which come into consideration for registration in the cadastre, may already be estimated at more than 1,500,000 H.P.

Regarding the works completed by the service for water-power and electricity, projects being carried out and plans in consideration, the following may be told:—

Two completed waterpower works have already been put to active use, i.e., the state powerhouse in the Tjatoer Valley for the use of the state railway workshops in Madioen, which has produced excellent results since 1917, and a small powerhouse south of Bandoong which since 1918 has served for the wireless station at that place.

A waterpower work to supply the government gold mines and the private mines at Redjang Lebong with energy is almost completed on the Ketahoen River near Lake Tais in Benkoolen.

The powerhouse Tjatoer near Madioen has two turbines of 1,000 H.P. each, working under a water pressure height of 110 M. The supply aqueduct has a total length of 2,200 M. from the water reserve to the pipe conductors of the turbines, in which are two tunnels respectively 240 and 360 M. long. The electrical energy is transmitted under a pressure of 25,000 volts along an air conductor on iron masts to the sub-station at Madioen.

The waterpower station at Lake Tais in Benkoolen is at present provided with two turbines of 1,000 H.P. each, working under 50 M. water pressure.

The small waterpower installation for the wireless station near Bandoong has a power of about 200 H.P. A second water-power work for the wireless station, of ± 350 H.P., is almost completed.

There are also in course of construction in Java two water-power works, i.e., on the Tji Anten and Tji Tjatih for the railway and to supply energy to the residency of Batavia and West Preanger, besides two works on the Tji Saroewa for purpose of supplying hydro-electrical energy to the mountain plateau of Bandoong.

The power to be installed in these four stations will amount to about 40,000 H.P. (on the turbine axle). Of this 28,000 H.P. will go to the station at Tji Anten, for the purpose of taking up the considerable variation of load of the electric railways in and around Batavia.

The new waterpower work of 3,000 H.P. on the Tji Kapoendoeng, will replace the old Dago station of the Bandoong Electricity Company, which will be taken over by the state and held in reserve.

A vigorous continuance of the government's exploration of great waterpowers in the outlying possessions is necessary to determine before long the industrial possibilities in connection with powerful and cheap waterpower, particularly in the field of the so-called nitrogen industry.

FAR EASTERN IRON AND STEEL

A MACHINERY AND IRON BUSINESS, JAPAN.—With offices at 13 Itchome Shibaguchi, Shiba-ku, Tokyo in the charge of Taigo Hattori, Hattori Taigo & Company will operate in iron tubes, iron supplies and machinery.

* * *

B LAST FURNACES IN SUMATRA.—The blast furnaces at Tandjong Karang (South Sumatra) now work regularly and furnish a splendid quality of iron. Batavia and Sourabaya experts praise highly the results.

The drydocks in the two ports employ this metal regularly.

* * *

IRON IMPORT INCREASE, JAPAN.—Though the reduction in the output of iron is still being enforced the iron market remains dull and pig iron is now quoted at from Yen 70 to 80, while the highest quotation during war time was Yen 500. Nevertheless the import of iron ore has been steadily on the increase. According to a report to hand, the amount imported during 1920 stood at 11,039,466 piculs valued at Yen 14,896,520, an increase of over 13 million yen as compared with 1912. We give below the amount and value of iron ore imported during the past nine years:—

	Volume (In 1,000 piculs)	Value (In Yen 1,000)
1912	3,307	1,178
1913	4,670	1,585
1914	4,987	1,725
1915	5,152	1,812
1916	4,669	1,671
1917	4,954	2,455
1918	6,015	9,673
1919	10,351	16,138
1920	11,039	14,896

* * *

MANUFACTURE OF CRUCIBLE STEEL IN JAVA.—The Russian engineer Menschich, employed with the N. I. State Railways, has constructed an oven which has been taken in use.

This oven has been constructed in order to make crucible steel out of all sorts of scraps and waste of iron and steel. It is heated by means of liquid fuel (residue). The heat is so strong that steel scraps can easily be melted and leaves the oven with sufficient temperature to furnish fine castings.

It is certainly of a great value to be able to make useful toolsteel out of scraps and waste, such in a country where there are no big steelworks at hand, who turn steelwaste into toolsteel by means of the Siemens Martin process.

Mr. Menschich has earned the sincere thanks of all who wish for the welfare of Holland's East India. Such men are wanted for the Islands.

* * *

HASHIMOTO TUBE MANUFACTURING CO.: organized to manufacture steel tubes. Office, 17 Sanchoma Senju, Tokyo. Manager: K. Hashimoto.

* * *

STEEL MAKING BY THE SOUTH MANCHURIAN RAILWAY.—It is said that the South Manchurian Railway has under contemplation a scheme for the production of iron and steel on a large scale, in addition to pig iron, which it is manufacturing now. Its daily output of pig iron amounts to some 300 tons, and it has in stock about 50,000 tons.

* * *

IRON INDUSTRY DEPRESSED.—The iron industry in Japan still remains dull. The Tokyo and four other iron foundries some time ago received a sum of Y.9,000,000 from the government as a subsidy and with the money they managed to tide over the difficult situation and maintain business, but owing to slack demand the stock has accumulated, and they are short of funds.

The Kenjiho and Penchihu iron foundries may, however, be able to obtain the necessary funds from the Mitsubishi and Okura companies respectively in view of their close connection with those establishments. The Toyo iron foundry has recently called the second installment of shares amounting to Y.4,000,000 and managed to raise the required fund, and the Tanaka iron mine has also resorted to a temporary loan to meet their immediate requirement.

One measure of relief is believed to be a combine. The plan of which is before the economic and financial committee. The plan to establish a common selling guild among a few large iron establishments including the Toyo, Tanaka, Penchihu and Mitsubishi concerns has not yet reached maturity, though negotiations are still going on.

THE YAWATA STEEL WORKS IN JAPAN.—A long account of the government steel works at Yawata (Kyushu) in Japan has been received in the department of overseas trade from the commercial counsellor of the British embassy, Tokyo. The town where the works is situated has gradually expanded until it now contains a population of over 100,000, about 20,000 of whom are employed in the steelworks, which supply one-third of the quantity of steel on demand in Japan. Over 60 per cent. of the ore used is imported from China. In 1899, when the works opened, they made a small profit only, and for the subsequent ten years there were continued losses. It was only in 1910 that the tide turned. In the three years, 1916-1918, the profits aggregate Yen 133,940,000 (say, £13,400,000), which left a surplus of nearly £5,800,000, after building and other costs up to 1918 had been deducted. The quantity and value of steel in 1917 was 297,000 tons, and in 1918 310,000 tons. The production of pig-iron has declined from 302,000 tons in 1916 (the highest point of production, to 269,000 in 1918 and in 1919. On the other hand, the output of steel has increased from 282,000 tons in 1916 to 437,000 tons in 1919. The present full capacity of the works for the production of steel is about 700,000 tons; but when the extensions now in hand are completed the actual annual production will probably be 750,000 tons. Of the pig-iron for making this 750,000 tons, the management propose to make two-thirds themselves and get the remaining third from outside. In this way some 1,000,000 tons of ore will be required. The ore required for 1919 was estimated at 860,000 tons, of which they intended to get 550,000 tons from China and 310,000 tons from Korea and Japan, but the expected quantity not having been obtained, pig-iron was produced only to the extent of about 270,000 tons. The principal source of ore for the works is Tayeh, China, but the works own two mines in the Hwanghai Province, Korea, and have recently acquired two mining concessions in Echigo. There is also some difficulty about the coke. The quantity of coal now consumed at Yawata, both as fuel and for converting into coke, is 1,690,000 tons, of which about 700,000 tons are supplied from the Futase Colliery belonging to the works. After prolonged experiments they have succeeded in making moderately good coke from coals from various sources. On the completion of the extensions now in hand it is estimated that 1,000,000 tons of good coal will be required annually for coke-making and 1,500,000 tons for fuel. The number of workers employed is 22,853 (exclusive of officials). The average wages of workmen are about Yen 55 (about £5 12s. 3d.) per month, and those of coolies (including women and youths) are Yen 1.54 (about 3s. 2d) per day. As a result of the strikers last spring the works has adopted an eight-hour day.

* * *

KAILAN IRONWORKS.—The Kailan Mining Administration is reported to have decided to establish a big ironworks in Chinhuantao with a capital of \$15,000,000. The site covers 30 square miles and reported to have decided to establish a big ironworks in Chinhuantao with the output is estimated at 2,500,000 tons of pig-iron per year. In this connection, a contract for the raw materials has already been concluded with the Pinghsiang Iron Minnig Co. in the Yangtze Valley.

* * *

THE IRON SITUATION IN JAPAN.—Mr. J. Takebe, superintendent of the South Manchuria Railway Company's Coal Sales Office, who has returned from a tour of Tokyo, Osaka, and Kyushu, has commented upon the iron situation to the following effect:—

The shipbuilding-yard has sunk to the bottom of depression, and a semblance of activity is kept up merely by the pursuance of the so-called "Eight Dreadnaught and Eight Cruisers" plan. Such materials as are required for the manufacture of warships appearing limited to a specified list, this does not seem to affect the general market at all.

Nowadays, iron price is quoted at between Y.60-Y.70, whilst the production cost is high as Y.100.

The iron works management is cutting down the iron outputs barely within keeping up the fire in the grate of the blast furnaces. It will have to play the waiting game.

On the other hand, the first gleam of the returning day has appeared over the economic horizon, and the goods under storage are being cleared at the rate of nearly 10 per cent. It may be that the night of business depression is on the wear and far spent.

For these reasons the market for the iron produced at the Anzan Iron and Steel Works will prove difficult to exploit.

* * *

STEEL WORKS PLANNED FOR YANGTZE PORT.—It is learned that the military governor of Hupeh province has filed with the ministry of agriculture and commerce plans for the erection of a large blast furnace at Huangshihkang port on the Yangtze River, a few miles below Hankow and Hanyang. These furnaces are intended to handle ores of the Hsiang-pishan iron mines in the vicinity, which are said to be of excellent quality and capable of being worked into the highest grade of steel.

Engineering, Financial, Industrial and Commercial News

AUTOMOBILES

Automobiles, Tsingtau.—Vice-Consul Allman calls attention to the fact that Tsingtau has perhaps the best roads of any city in the Far East, and is therefore well adapted to the use of motor cars. The main streets in the city are asphalted and the other streets and roads in the immediate district are macadamized. The road construction under way in the Shantung province will also create a greater demand for cars, probably of the cheaper-grade passenger cars and motor trucks. At present Shanghai supplies the Tsingtau district with motor cars and accessories, but the local agents and garages are dissatisfied with this source of supply because of the uncertainty of getting cars and supplies when needed.

Kwangteh-Szean Automobile Road.—Construction of an automobile road between Szean, Chekiang, and Kwangteh, Anhuei, a distance of about 45 miles, has been started by the local merchants. At the last conference of the promoters, an agreement was reached that the work will cover the building of a new road from Szean to Chiapa and the repairing of the old main road from Chiapa to Kwangteh (all to be 15-ft. wide, and 25-ft. where automobiles should meet) at an estimated cost of \$300,000, including the cost of building bridges and purchasing automobiles. Three automobiles for carrying passengers and seven for freight purposes will run a regular service along this line, 8 times a day. A net annual profit of more than \$100,000 is expected to be made when this automobile transportation service is established.

Shanghai-Taitsang Motor Truck Service.—The ministry of agriculture and commerce has approved of the scheme formulated by Tang Wenchih for a motor truck service between Chapei and its terminus Liuho, Taitsang.

AVIATION

Tokyo-Fusan Service.—The establishment of regular aerial transport between Tokyo and Fusan is contemplated within the present year. A company with a capital of Y.10,000,000 is to be formed. It is the intention to extend the service subsequently to Manchurian centres.

Straits Air Service.—An air-service company is being floated in the Straits Settlements by Chinese. Mr. Tan Choo Boon, B.A., a military aviator recently arrived in Peking from Manila in connection with the project. A service between the Straits Settlements, the Philippines and China is contemplated. The Chinese chambers of commerce, Manila and Singapore are supporting the enterprise.

Invents Hydro-Plane.—The Hochi says that Mr. Cho, a director of the Nihon Kaijo-soko Kabushikigaisha has invented a new hydro-plean similar to the more modern types in western countries. It has a cabin capacity of 50 persons and can also carry enough gasoline for a 3,000-mile flight. Its speed is said to be 100 miles an hour.

Airship for Japan.—The *Pall Mall Gazette* says: "In addition to quantities of armorplate, projectiles and submarine engines now in hand, Vickers are building an airship of the Scout type for the Japanese navy, and the Whitehead Torpedo Factory at Wyke, Dorset, is filling an order for torpedoes for the same service.

These, however, exhaust the list of contracts which are being executed for Japanese naval material, and so far, at any rate, there is no sign

of the big battle cruiser order which was rumored to be imminent some weeks ago.

British Aviators for Japan.—When the next group of British naval aviators arrive in Japan in June the Kasumigaura airdrome will be completed and ready for use, if plans of the naval authorities here are carried out. All capital ships of the imperial navy will be provided with one or two airplanes when the airplane tender *Hosho*, 9,500 tons, is completed at the end of 1922.

The model deck and sliding platform of the Kasumigaura naval airdrome are already completed and the first class of Japanese students to be trained there will consist of 20 members. These will be under the instruction of the newly arrived British aviators.

New Aviation Schools, Japan.—The Shima-shizu branch aviation school was opened April 1st at Chiyoda-mura, Chiba prefecture. The Akeno school at Kitahama-mura, Miye Prefecture, was also opened the same day.

BRIDGES

Yellow River Bridge Tenders.—The Government has been advised that the Belgian engineer engaged for the Yellow River Bridge commission cannot arrive in China before the end of June, and it is suggested that the date for the opening of the tenders for the reconstruction of the said bridge should be postponed to the 31st July. This suggestion is under consideration by the ministry of communications. At the request of the Japanese legation, a Japanese railway engineer will be appointed to the commission of Anglo-French-Belgian-Chinese engineers. Dr. Wellington Koo, minister to London, reports that he has engaged a technical expert to report upon the Yellow River Bridge.

Hangchow Railway Bridge.—It is reported that the work on the railway bridge across the Chao-o River, which was being built by a German firm and stopped during the war, is now to be given to a British firm.

BUILDINGS

Memorial Laboratory, Tokyo.—A magnificens structure extending over 300 *tsubo* and costing approximately Y.300,000 will be established at a laboratory of the Juntendo Hospital in commemoration of Dr. Sato's contribution to the medical sciences in Japan, says the Chugai Shogyo.

New Hotel, Tokyo.—The plans call for an expenditure of at least 20 million yen.

"Plans are well under way," to erect a new hotel in front of the Tokyo Station by the Asano interests. There will be 800 rooms capable of accommodating 2,000 guests.

Huge Building Scheme, Manila.—The Manila authorities have formulated a plan for the construction of modern houses, to be financed by the city and later paid for by tenants in long-time instalments. The plan will be the biggest step in bringing an eastern city to modern lines that has ever been undertaken. With 20 blocks to be rebuilt, covering an area of 30 acres, comprising more than 700 homes, an idea of the extent of the work may be gathered.

Tientsin Exchange.—Some Japanese business men in Tokyo and Osaka are taking steps to erect an exchange at Tientsin with a capital of Y.7,500,000.

Y.M.C.A. Building, Soochow.—The completion of the Y.M.C.A. building at Soochow has been delayed, as additional buildings are to be erected out of a contribution of \$5,000 Gold contributed by Mr. Crane, American minister to China.

New Schools, Japan.—The department of education will build the following schools during the current year: Middle schools, 18; engineering, 9; agricultural, 29; commercial, 13; mercantile marine, 1.

Meiji Shrine Plans, Tokyo.—Work on the outer garden of the Meiji Shrine in Tokyo was commenced in April and it is hoped by 1924 the museum, race course and memorial buildings will be completed.

New Government Buildings, Osaka.—It has been decided to erect the governors' official residence with two other buildings in a suburb of Osaka on a plot of land 3,000 *tsubo* in extent. The buildings are to cost Yen 250,000.

ELECTRICITY

Musashi Electric Tramway, Japan.—A company formed for the construction and operation of a new electric line from Tokyo to Yokohama, running approximately a mile and a half inland from the present railroad, has been formed. The Musashi Electric Tramway Company, as the newly organized firm is called, will also furnish electricity to the villages along the route. The Tokyo terminus will be at Meguro and at Yokohama, Takashimas cho.

A Scheme to make Chapei independent of the municipal electricity department and Shanghai Waterworks is being considered.

A number of Chapei residents, under the leadership of one Chin Wen-li, have petitioned the civil governor stating that as the present system is very unsatisfactory it is essential that a new and more satisfactory system should be introduced.

It is proposed that a new power plant be established by merchants with an initial capital of \$300,000, and when capital increases telephone and water supply will be installed.

The Nagoya Electric Light Company has made a contract with the Inuyama Electric Light Company operating at Inuyama, Aichi prefecture, for amalgamation. This is believed to be part of the program of concentrating electric enterprises in and around Nagoya in one consolidated concern as contemplated by a group of business men.

Electric Light, Fukien.—Mr. Yang Yi-fen of Hinghwahsien, Fukien, has subscribed \$15,000 to instal an electric light plant.

Electrical Equipment in Siam.—Bangkok is the only city in Siam furnished with electric light and power stations, of which there are two, the Siam Electricity Co. (Ltd.), and the Samsen Power Station. The former supplies light and power to the public generally throughout the city, while the latter is the municipal light and power station for Bangkok, also providing lighting for a large area occupied by royal palaces, and motive power for Bangkok water works, for the opium factory, and for the Siam cement works.

Owing to the fact that no electrical apparatus of any kind is manufactured in Siam, there is a demand for all classes of such goods, with the addition of specialties needed for a tropical country. Electric lighting sets of various makes and sizes are advertised in the local press, but the demand appears to be moderate and limited to the provinces. The import duty on all electrical goods is 3 per

cent. *ad valorem*. There are no other restrictions in this trade, and it is not required to have the country of origin stamped upon any articles sold in Siam.

There has hitherto been no development of hydroelectric power in Siam, and in years with normal rice crops paddy husk is used for fuel, owing to its cheapness and the fact that the cost of oil, coal and wood is comparatively high, as compared with neighboring countries.

Electric Plant for Peking Market.—The request of the Tungan market merchants to erect a electric light plant to supply the market exclusively, has been sanctioned by the police.

Peking-Tientsin Tramway Project.—A Tientsin merchant named Hsu Wen-pin has applied to the board of agriculture and commerce for sanction to organize operation of a company for an electric tramway between Peking and Tientsin, beside supplying power for factories in the province, the promoter purposing to generate the current by using the water force in the Yungtingho River, by erecting an electric plant at Huailai Hsien.

Electric Plant for Golden Sand.—It has been decided to instal an electric light and power plant at Golden Sand, a city located in the Nantungchow district, because of the increased business of the centre, says the *Shanghai Times*. A company has been formed with a capitalization of \$25,000 and the machinery has been ordered from an American firm. The plant is expected to be in operation by the middle of April. The operating company is to be known as The Venus Company.

Moulmain in Burma is at present lighted by gas and its residents are agitating for the installation of an electric light plant. It is expected that tenders will be advertised in the near future.

Electric Plants, Russia.—There are to be built in Soviet Russia (including the autonomous districts), 643 electric plants, of these 246 have already been completed in the rural regions.—*Dalra News Agency*.

A Sub-Electricity Plant, Nanking.—The installation of a branch electric plant in a suburb of Nanking was started in the winter of 1919 by the order of the civil governor of Kiangsu, under the management of Mr. S. N. Shu, principal of a technical school at Nanking, and is now approaching completion. The building is of reinforce concrete. The plant will have a capacity of 500 kilowatts more than the main plant in the city, capable of lighting 50,000 lamps.

Asahi Electric Bulb Company.—Organized to manufacture electric light bulbs. Office: 14 Shichome, Yedo-bori, Nishi-ku, Osaka. Manager: S. Yasumo.

Okamoto Shoten & Company.—Organized for the purpose of manufacturing electrical tools, etc. Office: Hichome, Kamihon-machi, Minami-ku, Osaka. Manager: H. Nasu.

New Electric Combine, Japan.—The Teikoku Dento Company (Imperial Electric Light) has amalgamated with the Gaibo and Toyokuni Electric Companies and later absorbed the Shimotsuke Electric Company, Ltd. It has been decided to increase the capital of the combine to Y.24,645,800.

Kushu Soden Electric Company, Ltd.—This company, recently organized in Tokyo, is to have a capital of Y.20,000,000.

New Tramway, Japan.—The Tobu Tramway Company, Ltd. will construct new lines from the Sugito station to Nikko via Saitama and Tochigi prefectures. The estimate of construction cost is Y.6,000,000 which will be provided for either by an increase of capital or by borrowing.

Electric Power Schemes, India.—The development of electric power schemes in the Punjab has made considerable progress. Lahore and Amritsar are provided with electricity. Rawalpindi, Multan and Lyallpur will follow. Negotiations are proceeding with regard to Jullundur, Sialkot and

Gujranwala, and a scheme is under consideration for increasing the plant at Simla. In addition, a large scheme, estimated to cost one crore of rupees, has been initiated by three Indian gentlemen under the title of the Punjab Hydro-Electric and Industries Association, with headquarters at Delhi. It is proposed by this Association to develop electrical power on four canal falls and to join them together electrically so that power may be always available when any canal is closed.

Electric Light, Ipoh, F. M. S.—An electrical engineer specially engaged for this work arrived from England last December. Plans and specifications for two alternative schemes have been sent to the crown agents for reference to consulting engineers. A reply is now awaited. The electric lighting of Ipoh will be taken over by an electrical Board, which has recently been appointed to manage the government electric power supplies, including the Kuala Lumpur installation, and the preliminary works in connection with the proposed public power supply from the Perak valley.

ELECTRICAL DEVELOPMENT IN JAPAN

Plants in Seven Prefectures

Aichi Prefecture

Nagoya Electric Light Company, Ltd., Nagoya.
Okazaki Electric Light Company.
Toyahashi Electric Power Company.
Aichi Electric Tramway Company.
Bishu Gas & Electric Co.
Inszawa Electric Power Co.
Chita Gas & Electric Co.
Bishoku Electric Light Co.
Fukui Electric Light Co.
Asahi Electric Light Co.
Hirosaka Electric Power Co.
Ensan Electric Power Co.
One Lumber Mill.
Tawara-machi Electric Power Co.
Otokawa Electric Power Co.
Mikawa Lumber Mill.
Tamakawa Hydro-Electric Co.
Tosan Electric Power Co.
Shinoshima Electric Power Co.
Total 19 companies.

Nagano Prefecture

Ichigo Electric Power Co.
Nozawa Hot Springs Hydro-Electric Co.
Otami Electric Light Co.
Shinanao Electric Power Co.
Nagano Electric Light Co.
Aki Electric Power Co.
Matsumoto Electric Light Co.
Yamabe Electric Power Co.
Tochiku Electric Power Co.
Yakawa Hydro-Electric Co.
Suwa Electric Power Co.
Takatow Electric Light Co.
Nakazawa-mura Electric Power Co.
Ina Electric Tramway Co.
Electric Steel Works.
Yoshida Electric Light Co.
Ogawa Hydro-Electric Co.
Chuo Paper Mill.
Kiso Electric Power Co.
Wada Hydro-Electric Co.
Nanshin Electric Power Co.
Katsukai Hydro-Electric Co.
Neha Hydro-Electric Co.
Kawashima Electric Power Co.
Oyakawa Electric Power Co.
Mitsui ne-mura Electric Power Co.
Chikumagawa Hydro-Electric Co.
O-hyuga Electric Power Company.

Gifu Prefecture

Gifu Electric Power Co.
Kajikawa Electric Power Co.
Itatorigawa Electric Power Co.
Mino Electric Tramway Co.
Ogaki Gas & Electric Co.
Okita Electric Power Co.
Dajimi Electric Light Co.

Tsumaki Electric Power Co.
Dachi-machi Electric Power Co.
Akechi-machi Electric Power Co.
Yaozu-machi Electric Power Co.
Kajita-mura Electric Power Co.
Kashibo-mura Electric Power Co.
Kiso Electric Power Co.
Nokatsu Electric Power Co.
Iwamura Electric Power Co.
Shirakawa Hydro-Electric Co.
Samigawa Hydro-Electric Co.
Kurino Hydro-Electric Co.
Yawata Hydro-Electric Co.
Shiratori Electric Power Co.
Hida Electric Light Co.
Funatsu Electric Light Co.
Kunogawa Hydro-Electric Co.
Ibusi Mine Works.
Tono Electric Power Co.
Sakauchi Electric Light Co.
Kaminohogawa Hydro-Electric Co.
Toki Hydro-Electric Co.
Aki Electric Power Co.
Tsuruoka Electric Power Co.
Mino Electric Power Co.
Suwara-mura Power Co.
Fuchu-mura Power Co.
Total : 34 companies.

Shikawa Prefecture

Komatsu Electric Power Co., Noto Branch
Noto Electric Power Co.
Anamizu Hydro-Electric Co.
Tomiki Electric Power Co.
Nakajima Electric Power Co.
Komatsu Electric Power Co.
Komatsu Electric Tsuhata Branch
Mukajima Electric Power Co.
Kanagawa Electric Power Co.
Taseiji-gawa Hydro-Electric Co.
Shirohachi Electric Power Co.
Hasaku Electric Power Co.
Dokyo-gawa Electric Power Co.
Wagura Electric Power Co.
Onsen Electric Tramway Co.
Matsukane Electric Tramway Co.
Kanazawa Electric Tramway Co.
Tsuruki-machi Electric Power Co.
Total : 18 companies.

Toyama Prefecture

Toyama Electric Power Co.
Komatsu Electric Power Co.
Komatsu Electric Power Co., Haku Branch
Oiwa Electric Power Co.
Takaoka Electric Light Co.
Hyomi Electric Power Co.
Demachi Electric Light Co.
Kakiha Electric Power Co.
Chuetsu Electric Power Co.
Chuetsu Electric Industry Co.
Toyama Electric Tramway Co.
Initsugawa Electric Power Co.
Besso-gawa Hydro-Electric Co.
Kamozumi-gawa Electric Co.
Nishigaki Electric Co.
Yamazaki Electric Co.
Yujin Electric Power Co.
Total : 17 companies.

Fukui Prefecture

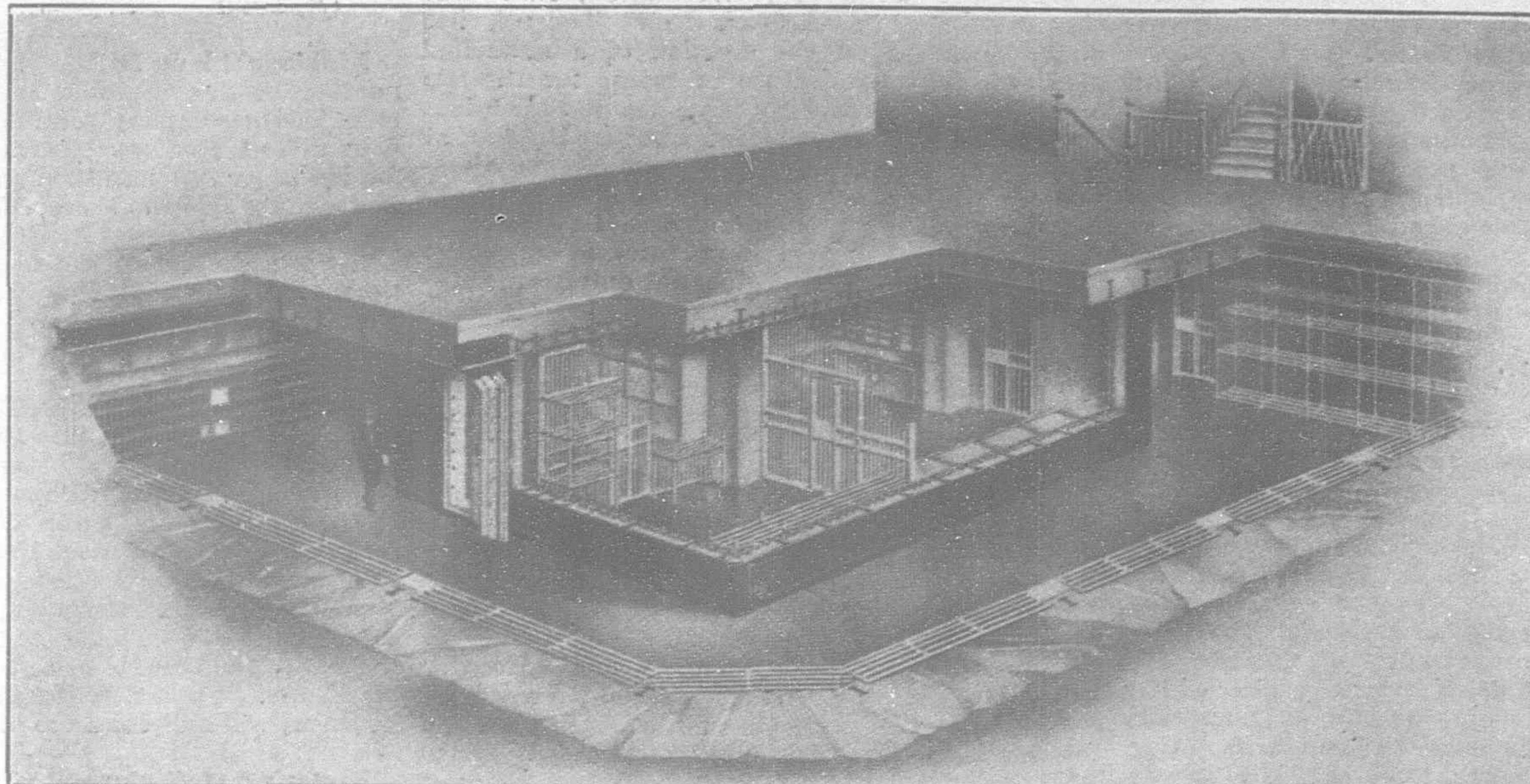
Wakasa Electric Power Co.
Mimigawa Hydro-Electric Co.
Suruga Electric Light Co.
Ichizen Electric Power Co.
Mikumi Electric Light Co.
Katsuyama Electric Power Co.
Taisho Electric Power Co.
Busho Electric Power Co.
Kyoto Electric Light Co.
Fukui Electric Power Co.
Nanetsu Electric Power Co.
Fukui Electric Power Co., Branch
Ano Hydro-Electric Co.
Hino-gawa Hydro-Electric Co.
Taseijigawa Hydro-Electric Co.
Total : 15 companies.

Miye Prefecture

Jusshu Electric Power Co.
Kitase Electric Power Co.
Tsu Electric Light Co.
Mano-gawa Hydro-Electric Co.
Iwakura Hydro-Electric Co.

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BANKERS' ENGINEERS, BOLTON, ENGLAND



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Stocks of Safes and Strong Room Doors Carried

Tasei Hydro-Electric Co.
Matsuzaka Hydro-Electric Co.
Ise Electric Tramway Co.
Hamajima Electric Power Co.
Kitamura Electric Power Co.
Osagi Electric Power Co.
Orashi Hydro-Electric Co.
Shimmiya Hydro-Electric Co.
Kuki Electric Light Co.
Kitanachigawa Hydro-Electric Co.
Taikoku Steamship Company.
Nachi Hydro-Electric Company.
Namikiri Electric Power Co.
Total: 18 companies.
Grand Total: 149 companies.

Electric Power, Penang.—The municipal commissioners of Georgetown, Penang, on March 22, signed an agreement with the F.M.S. government for supply of electric power for the Penang Hill Railway.

COMMERCIAL FINANCE

Development Loans, Japan.—The Industrial Bank of Japan reports that new loans to the extent of Y.51,425,000 will be placed on the market by the following companies:—Kyushu Electric Tramways, Y.5,000,000; Chosen Electric Industrial Company, Y.3,000,000; Morinaga Cake Mfg. Co., Y.3,000,000; Japan-British Industrial Co., Y.5,000,000; Sala Phosphate, Y.7,000,000; Hokkaido Coal and S. S. Co., Y.10,000,000 in two instalments; Dai Nippon Artificial Manure, Y.5,000,000; Shirokiya Department Store, Y.3,000,000; Toshio Commercial Co., Y.1,500,000.

Straits Settlements Loan.—The local office of the Hongkong & Shanghai Banking Corporation has received telegram from its Singapore branch, which states: Straits Settlements loan, year 1921, Straits \$20 millions, will be issued on May 2, 1921, interest at 7 per cent. per annum payable half yearly, tax free other than death duties, issue price 100 per cent., repayable at par on May 1, 1926.

New Bank.—The opening of the Shanghai and Haimen Industrial Bank at No. 468 Tientsin Road took place recently.

COMMERCIAL

Chinese Dispensary, Shanghai.—A new pharmaceutical enterprise, capitalized at \$100,000, to prepare drugs from native medicinal herbs, is being organized by local merchants at Shanghai.

Fujiye Shoten.—Organized for the sale of tools, stone-lumber and building materials. Office: 463 Higashi Hirai-cho, Fukagawa-ku, Tokyo. Manager: K. Banto.

Nishimura Shoten.—Organized with a capital of Yen 300,000, quarter paid up, to engage in general trading business with China. Office: 19 Nichome, Nakanoshima, Kitaoku, Osaka. Managing Director: K. Kishimoto.

GOVERNMENT FINANCE

New French Bank, Peking.—A group of French capitalists, co-operation with the Tobacco and Wine Administration are promoting a Sino-French Industrial Bank, registration of which has already been granted. The capital, fixed at \$10,000,000, is to be subscribed by Chinese and French in equal shares. The head office of the bank, which will be located on legation street, Peking, will be formally opened to business shortly, while preparations are under way for the establishment of branch offices in treaty ports.

INDUSTRIES

Bamboo-paper Pulp Plant.—It is learned from Vice Consul Thorling that a big bamboo-paper pulp plant is to be opened in the Pegu district, Burma, by F. W. Heilger & Co., who are the managing agents

for the Titaghur Paper Mills Company (Ltd.), as well as for several coal companies and jute mills in India. This concern has recently opened an office in Rangoon.

Hunan Cotton Mill.—The first Hunan cotton mill is reported as being very prosperous. During the year ex-Tuchun Chin-yao attempted to sell it to the Mitsui Company. A Chinese company has taken over the plant on a sixteen-year lease from the provincial authorities. The mill has 40,000 spindles and at daily capacity of 150 bales. Its valuation is placed at \$1,000,000 and its net profit annual at \$2,000,000.

Paper Mill, Hangchow.—A paper mill has been established in Hangchow by Messrs. Van Tse Min, Chien Yin, Tang, Hsu Jin Chow, Hsu Nien Kien, with a capital of \$1,000,000.

Cement Works at Lungwha.—Chang Chien and Chu Pao-san are the promoters of a large cement plant to be established within a short time at Lungwha, near Shanghai. The capitalization of the project has been set at \$1,000,000. As soon as sufficient subscriptions have been made to the stock, machinery will be ordered from Europe and America.

Tannery, Kirin.—A Chinese company, with a capitalization of \$5,000,000, has been organized to operate a tannery in Kirin to be located near the Chen Yuan River. Construction work has begun. A Russian leather expert has been engaged to supervise the work.

Foochow Industries.—A machine works is being organized in Foochow for the manufacturing of all kinds of machinery and for repair work by Admiral Sah. A capitalization of \$150,000 is the goal of the company, \$50,000 having been subscribed. Modern machinery will be installed as soon as sufficient funds have been obtained. A button factory turning out bronze buttons is being operated successfully in Foochow and now has a daily output of 500 gross. The Foochow match factory is also progressing well. Fukien province has an industrial company under organization with

a capitalization of \$1,000,000, one-fourth of which will be subscribed before operations begin. The first ventures will be the establishment of a brewery and a tannery.

German Wine and Tobacco Machinery.—Due to conditions in Germany, many wine and tobacco plants are attempting to dispose of their machinery, says the *Shanghai Times*. Recent advances made upon the part of German merchants has resulted in the formation, according to the Chinese press, of a Sino-German company for the manufacturing of wine and tobacco products in China. The machinery, it is said, will be shipped to China and will form the German share of the capital.

Egg Factory, Hankow.—A well-known Chinese merchant of Hankow has established an egg products factory with 150 workers employed. A cold storage plant is being built in connection with the plant.

Cement Plant Extension, Siam.—The Siam Cement Co., Ltd. has under consideration a scheme to double its output. It ended the year with a record net profit of Tcs. 633,014.22, carried forward Tcs. 167,851.89 and distributed Tcs. 407,493.04.

Wusieh's Industries.—The industrial plants of Wusieh, include 8 cotton mills, silk filatures, 16; flour mills, 6; oil mills, 8; weaving plants, 15; hosiery plants, 8; soap factories, 2; umbrella factories, 1; rice hulling mills, 15; spindle factories, 1; magnesium works, 1; total of 78 mills and 23,000 male and female workers.

New Macaroni Plant.—The Hing Wah Paste Company plans to construct a five story plant at Siao Sa Doo Road Shanghai, to supplement plant on Soochow Road and the one in Hongkong. The capitalization of the company has been increased to \$1,000,000 and modern macaroni machinery ordered from the United States.

New Flour Mill, Kwachow.—A new flour mill named The Tsen Fen Mill is shortly to be established in Kwachow on the eastern side of Yangchow. Its capital is \$600,000.

Siam's Machinery Imports.—With the exception of a few small rice mills made by local European and Chinese firms, there appears to be no machinery manufactured in Siam. The volume of such imports from abroad has hitherto been comparatively small. Considerable quantities of modern mining machinery has, however, been in use in Siamese Malaya, notably tin dredges, many of which have been supplied by well-known American firms. These firms have also furnished similar machinery for excavating canals for Siam's extensive irrigation scheme which is now under construction.

In view of the latter scheme, which is expected to bring extensive, more or less dry, areas under cultivation, and part of which may be completed during 1921, it is expected that a fairly large number of tractors and other agricultural machinery will be needed very soon. In fact, experimental work has already been successfully done in the use of several well-known tractors. Demonstration by capable engineers is essential in the beginning, and there are now in Siam two experienced American engineers who may possibly undertake the work.

Of marine motors, the small American outboard type has become very popular, and owing to the fact that some 400,000 small boats are registered as in use in Bangkok alone, there is likely to be a continued demand for these.

Owing to the partial failure of Siam's rice crop for the 1918-19 season, there has been but little activity in the imports of rice-milling machinery during the last two years, but prior to the war Germany did an extensive and sole business in this class of machinery. However, the prospects for a fair rice crop for the current 1920-21 season are good, and therefore a normal demand for rice-milling machinery seems again possible.

The demand for textile machinery has hitherto been insignificant. Cotton goods or other textile fabrics and yarns are not manufactured in Siam, but some weaving is done on native and Chinese looms.

Cotton Mill, Mukden.—The machinery for the Mukden cotton mill will be delivered some time

in August. A report is circulated that as the short-staple cotton produced in Manchuria can not well be used in the manufacture of good grade cotton cloth, the purchase of American cotton is now under consideration.

Municipal Brickyard, Wellington, N.Z.—The city council of Wellington, New Zealand, has under consideration the erection of a municipal plant for the manufacture of bricks for the use of the city, since there is a large demand for bricks for its public-improvement work. Bricks at present are selling as high as £5 (\$24.33) per thousand bricks and have recently sold as high as £5 10s. (\$26.76) per thousand. It is thought that the erection of an up-to-date brickmaking plant might be found of great value, not only to the city but to the public in general.

Cotton Mills, Woosung.—Two new cotton factories, the Ta Chung Hua and the Hung Feng, are expected to be ready for operation in April, at Woosung-near Shanghai.

New Brick Factory, Federated Malay States.—A company has recently been incorporated for the purpose of pressing bricks composed of sand and lime, and has purchased an area of 34 acres at Serdang, Federated Malay States, where the factory and plant will be erected. In addition the company has acquired a lease for 21 years to use sand from 181 acres adjoining the purchased area. Bores have been put down over the areas where the sand is to be obtained and the results show that a practically unlimited supply of first-class sand is available. It is stated that the superiority of sand-lime bricks as compared with clay bricks has been amply proved in Europe during the past 17 years. Their manufacture has increased from a few millions a year to over 2,000,000,000. The percentage of lime used in making the bricks varies from 5 to 10 per cent. of the total material required.

Techow Arsenal Extension.—Plans have been completed for the extension of the arsenal at Techow where a plot of 50 mow has been secured for the construction of a large furnace.

Cigarette Factory, Wuhu.—A tobacco company is soon to be established at Kin Ma Gate, in Wuhu, with a capital of \$1,000,000. The northern part of Anhwei will supply the tobacco for the use of this company.

Canton Co-operative Mill Project.—The recent strike of workers employed in the five large native cloth mills in Honam has resulted in a project to start the cloth mill on a co-operative basis. The workers have promised to subscribe whatever capital they have to the new enterprise.

China Cotton Statistics.—At the request of the International Federation of Master Cotton Spinners' and Manufacturers' Associations, Manchester, the Chinese Cotton Millowners' Association has drawn up a table of statistics showing the number of spindles in China, the amount of cotton consumed during a half year and the raw material in stock. In compiling these figures the association has had the co-operation of the Cotton Millowners' Association of China. The table is as follows:

(1) Number of cotton spinning spindles (exclusive of waste and doubling spindles):	
(a) Total number of active and idle spindles	1,422,832
(b) Number of active mule spindles	nil.
(c) Number of active ring spindles	1,391,304
(d) Number of spindles in course of erection and expected to be working this year	115,000
(2) Quantity of cotton used for the half year ending January 31, 1921:	
	bales of 500-lb.
(a) Chinese cotton	342,577
(b) American cotton	8,318
(c) East Indian cotton	51,311
(d) Egyptian cotton	nil.
(e) Sundries	nil.
(f) Total	409,206

(3) Cotton mill stocks on February 1, 1921:	
	bales of 500-lb.
(a) Chinese cotton ...	164,274
(b) American cotton ...	4,619
(c) East Indian cotton ...	13,985
(d) Egyptian cotton ...	78
(e) Sundries ...	nil.
(f) Total ...	162,945

Kiukiang Flour Mill.—During the last winter a number of the wealthier merchants of Kiukiang organized a company for the operation of a large flour mill at that port, says the *Shanghai Times*. Sufficient capital has been obtained to make the project possible and several hundred mow of land along the water front have been purchased. The work of building will be begun within a short time. Kiukiang is lacking in industries of a manufacturing nature, a match factory employing 300 girls being the sole activity at present.

Whitin Machine Works.—The Whitin Machine Works, of Whitinsville, Mass., builders of cotton mill machinery, are making plans to open shortly an office of their own in Shanghai with a technical staff, under the direction of Mr. F. R. Pratt, a member of the American Society of Mechanical Engineers. It is the intention of the Whitin Machine Works, furthermore, to keep an adequate supply of repairs on hand for the accommodation of the mills. The office is to be conducted independent of Messrs. Gaston, Williams & Wigmore, who, however, will still continue to act as sales agents.

Factories at Wuhu.—Wuhu is becoming an industrial centre and now has a number of factories in successful operation. A match factory, capitalized at \$140,000, is doing a prosperous business. A flour mill, the only one in Anhwei province, has been established for twenty years. Its capitalization was recently increased from \$20,000 to \$500,000. The production is now 720 sacks daily. A cotton mill was established in 1919 by Chow Tse-chi, a former minister of finance, with a capitalization of \$1,000,000. Dividends declared by the company in 1920 amounted to 20 per cent. There are also two glass chimney plants in the city.

Can Factory, Shanghai.—A company to operate a plant for the making of cans and other tinware in Shanghai has been organized by C. C. Nieh. During the next month the building, located in the western district of the city, will be finished and the machinery, which has been ordered in the United States, is expected within a short time.

Workshop at Sungkiang, Kiangsu.—An official workshop has been established at Sungkiang for the instruction of the young workers of the city in various trades. The shop now makes enamel wares, basins and bath tubs. This year a large machine and an oven will be added to the equipment. More than sixty graduates and nineteen apprentices are now in the school.

Korean Industrial Plants.—An official industrial report from Chosen states that the total number of factories there is 2,900, the investment in them being Y.129,370,000. Their annual production is estimated at Y.225,400,000. Compared with 1917 these figures are an increase of between 50 and 60 per cent. The principal industries in Chosen are cereal cleaning, tobacco manufacturing, metal refining, cotton ginning, brewing, metal working and timber yards.

Kiangnan Arsenal.—The Kiangnan Arsenal has been instructed by the ministry of war to increase its output and enlarge its facilities in order to supply the central government with arms to carry out the Mongolian expedition.

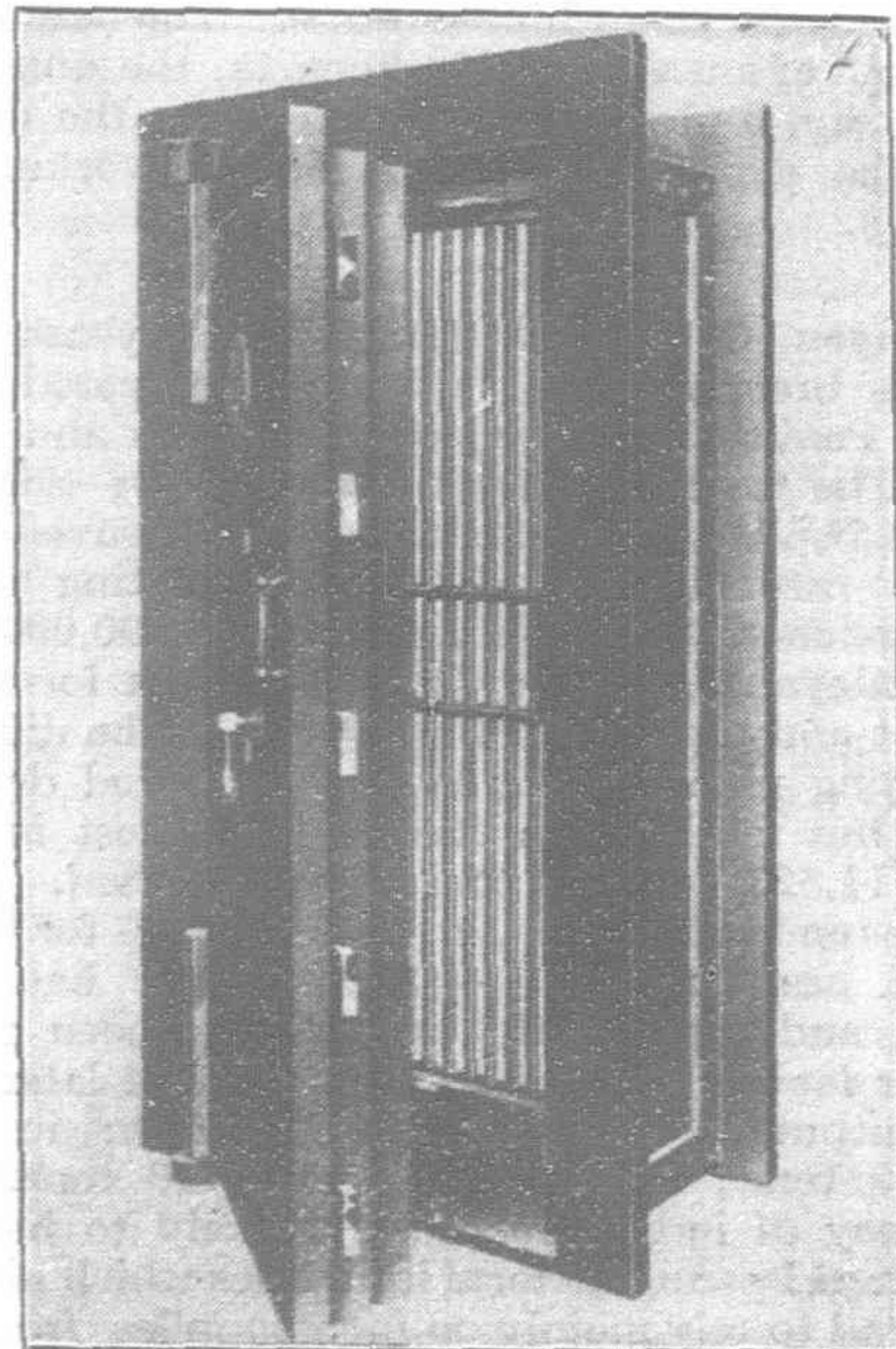
Pootung Cotton Mill.—An addition to the long list of cotton mills now in existence is a new plant that is soon to be installed at Pootung, the building occupying 40 mow of land. The mill is to be equipped with 100,000 spindles of Chinese manufacture and the engine and motors have been ordered from a German firm. The mill also plans to install 800 hand cotton gins and twenty to be operated by oxen. Operations are expected to begin during August.

Tannery and Distillery, Foochow.—The Fukien Industrial Developing Company, Ltd., is being

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organized with a capital of \$1,000,000, to erect a factory in Foochow to tan hides and distill spirits.

New Cotton Mill, Hunan.—The Hua Shih Spinning & Weaving Co., in Hunan, is raising \$500,000 for the establishment of a cotton yarn concern.

Industrial School, Chinkiang.—Mr. Z. C. Hsu, manager of the Pu Yih Cotton Mill, Shanghai, will found an industrial school at Chinkiang, Kiang-su. Mr. Hsu has donated a sum of \$50,000, and has put the organization under the management of Mr. Y. P. Wang, of Shanghai. A lot of land with an area of 27 *mow* has been purchased and 100 *mow* of farm fields obtained for practical farm work.

Industries, Siberia.—The council of peoples economy is now engaged in working out plans for the leasing of concessions to foreigners. It has already been determined that these concessions should be part of the big plan of reconstruction of the Far Eastern republic and to this end the foreigners who will be most favored as far as the leasing of the concessions is concerned will be those who are to employ the most modern implements and methods. These concessions comprise the construction of rail and water routes, the building of ports and harbors and so on.—*Dalta News Agency.*

A Chinese Cement Plant, Shanghai.—A cement plant capitalized at \$1,000,000 and equipped with the latest machinery is being established by Mr. P. S. Chu and Mr. Chang Chien, industrial magnates of Shanghai and Nantungchow, at Lunghwa, near Shanghai.

To Collect Native Products.—The ministry of communications has dispatched circulars to all the railway boards instructing them to make an extensive collection of different sorts of mineral, agricultural and manufactured products of various places along the trunk lines in order to facilitate studying the great variety of native produce and improving their producing efficiency. The railway administrations are also ordered to exhibit varieties of Chinese produce at the different stations.

Taiyo Shokai & Co.—Organized to manufacture electrical insulators. Office: 289 Kita Nagatsuka, Toyosaki, Nishinari-gun, Osaka. Manager: K. Miyaagi.

Saito Paper Mfg. Co., Ltd.—Organized with a capital of Y.350,000. all paid up. Office: 7 Sanchome, Yedo-bori, Nishi-ku, Osaka. Manager: K. Motohashi.

Whangpoo Conservancy Board

Notification No. 106

Tenders are hereby invited for the supply of one **Stationary Floating Pumping Plant (for pumping ashore dredged material contained in barges)** capable of an actual working output of 300 (and alternatively 600) cubic yards of mud per hour.

Printed specifications and form of tender may be obtained on application to the Board's Office, Dredging Department, 6 Kiukiang Road.

Sealed tenders accompanied by specified plans addressed to the "**Whangpoo Conservancy Board, Shanghai**" and marked "**Tender for Pumping Plant**," must be sent in so as to be in the Board's hands on or before noon on the 30th October, 1921.

The Board does not bind itself to accept the lowest or any tender.

(Signed) H. von HEIDENSTAM,
Engineer-in-Chief.

SHANGHAI, May 27th, 1921.

Nito Forestry Company, Ltd.—Organized with capital of Y.200,000, half paid up, for exploiting forests, lumbering, etc. Office, 7 Gochome, Nishidotori-bori, Nishi-ku, Osaka. Manager: T. Nagakubo.

Ito Iron Works.—Organized with capital of Y.250,000, all paid up, to operate general and iron works, foundry and manufacture of machines and tools. Office: Dainin, Nishimari-gun, Osaka. Manager: T. Okaniwa.

Nippon Pigment Industry Co., Ltd.—Organized with capital of Y.100,000, quarter paid up, to manufacture coal, tar, dyes and other coloring matters. Office: 492 Nippori, Tokyo. Manager: S. Minowa.

Hakusan Productive Industry Co., Ltd.—Organized with a capital of Y.10,000,000, quarter paid up, to engage in reclamation, colonization and forestry enterprises. Office: 142 Tsumori, Nishinari-gün, Osaka. Managing Director: Shigejito Hakusan.

Imabayashi Oil Mfg. Co.—Organized for the manufacture of vegetable oils, etc. Office: Kudara-mura, Tosei-gun, Osaka. Manager: Y. Kobashi.

Sankyo & Company.—Organized to manufacture rubber shoes and general rubber works. Office: 1126 Kanasugi, Nippori, Tokyo. Manager: Y. Osuga.

Tokyo Casting Mfg. Co.—Organized to manufacture machines for foundry use. Office: Nippori, Kanosugi, Tokyo. Manager: T. Yuedo.

Tokyo Sakai Co.—Organized to manufacture brewing apparatus. Office: 15 Kawase-cho, Nihonbashi-ku, Tokyo. Manager: Y. Kudo.

Kikuya Furniture Mfg. Co.—Organized with a capital of Y.50,000, quarter paid up, to manufacture furniture, etc. Office: 104 Toyonakamura, Hono-gun, Osaka. Manager: C. Konishi.

Machine Shop, Foochow.—The Ming-Lih Metal factory, situated in Makiang, Fukien, established by Mr. Sha Tseng-bing in 1919, with a capital of \$150,000, to manufacture engines, has been absorbed by the government officials of Foochow.

ENGINEERING

Hastings Engineering Works.—Registered as a private company. Offices: 102 Clive St., Calcutta. Objects: Mechanical, electrical and motor engineers, exporters, importers and repairers of automobiles, motor cars, etc. Authorized Capital: Rs. 2,00,000.

MINING

Hupeh Mine Contract.—A mining contract authorizing the Japanese capitalists in Hankow to open up the mines of Feng Huang Chan in the Tayeh mining district, Hupeh, has been countersigned in Hankow between certain Chinese officials with the backing of the Tuchun and the Japanese, says the *China Press*.

The contract provides that the mining company shall be a sino-Japanese enterprise. The Japanese will advance \$2,000,000 to develop the mines, and the Chinese shall have no right to repudiate the agreement by refunding the Japanese capital. It is also stipulated that the Japanese shall supervise the running of the mines, the spending of money and the selling of ores. Again in case more capital is needed, the Japanese shareholders shall have the right of priority in making further loans.

Diamondiferous Lands, B.N.B.—Interest in the alleged diamondiferous land in the Labuk district, of British N. Borneo, which created quite a stir 15 or 16 years ago, has revived. Acting on behalf of a leading London financier, Mr. Elphinstone has visited the locality, and is bringing home samples for examination. If the outcome

of the tests is satisfactory, a prospecting syndicate will be formed, with a view to sending out a properly equipped prospecting party, but it will be wise not to be too optimistic, in view of the negative results obtained on the last occasion.

Kirin Diamond Mine.—The gold mining bureau at Kwangyinshan, Kirin, has discovered deposits of diamonds in a gold mine now being worked, according to the Chinese press. The stones are large and of an appreciable fineness, the announcements say, and specialists have given the opinion that the deposit is worth while as a working proposition.

Malayan Collieries, F.M.S.—Some years before the war broke out coal had been discovered in the Malay Peninsula, in the states of Perak and Selangor. The coal found at Rawang, in Selangor, some 25 miles from Kuala Lumpur, proved to be of first-rate quality, and as prospecting proved the existence of a supply of over 10,000,000 tons, the Malayan Collieries Co. (Ltd.) was formed to work it and place it on the market. The difficulty of getting plant during the war hindered development, but mining was started in earnest in 1915, when 11,523 tons of coal were obtained. Down to the end of 1918—the latest year for which figures are obtainable—437,388 tons had been mined, and the quantity would have been greater but for lack of equipment, shortness of labor, etc. The output in 1916 was 101,846 tons; in 1917, 155,279 tons; and in 1918, 168,740 tons. The discovery of indigenous coal is likely to have an important bearing on local industries which hitherto have had to rely mainly on fuel supplies from the natives forests.

Mining Concessions, Kwangtung.—The Chinese government has informed the British legation that it refuses to recognize the mining agreement signed between the former Kwangsi government in Canton and the Anglo-Chinese proprietary syndicate of Hongkong because it was done without the sanction of Peking.

American Dredge Project, F.E.R.—A Harbin report says that the Amur Mining Board has received a tender from a big American concern to put up twenty-five dredges on condition that the board will pay to the concern from 5 per cent. to 15 per cent. of its profit. After a specified time the dredges will become the property of the board.

Hainan Development.—A body of returned capitalists from the Straits Settlements have organized for the purpose of developing the resources of Hainan, says the *Canton Times*. They will confine their attention to opening up mines, reclamation and the fishing industry.

Coal Deposits, Magdagashi, S.I.B.—Blagoveschensk railway workers have discovered coal deposits near station Magdagashi. The average thickness of the layer is about 6 feet.—*Dalta Agency*.

Coal Mining in Shantung.—A new mine is being projected by a Japanese engineer at Szechuan, in the centre of the coal field of Shantung province, says the *Shanghai Times*. The deposit has been tested at Nantingchen and the property staked that occupies 400 li, has twenty-one veins, may be worked without difficulty, and is said to have a visible supply for forty years workings. Japanese capitalists including the Okura Company, wish to organize a company for the exploitation of the property, subscribing one-half of the stock and allotting the remaining 50 per cent. to the government of Shantung.

Peipieh Coal Mines.—Coal in Chiyangchow, Peipieh, is of such quality, that the Peking-Mukden Railway Administration has decided to operate mines there with a capital of \$5,000,000.

Mineral Investigation of Anhuei.—Mr. Li Hsien has been dispatched by the ministry of agriculture and commerce to investigate the mineral resources of Anhuei.

Mining in the Zabaikal and Amur Regions.—The supreme economic council at Chita have decided to stimulate the gold mining industry during the coming season, in Zabaikal, Amur, and the maritime regions, this industry will be given a new impetus by the introduction of modern improved methods of mining, modern machinery, etc. It is expected to take out of the mines during the course of the coming year, in the Zabaikal province about 290 poods (11,200 pounds) in the Amur region, including its three divisions of Amur Zeya and Booriansky, 250 poods (9,000 pounds), from the maritime provinces. The report of the expected output has not been received.

Large capital will be required for the financing of this project, and it has been decided to begin negotiations at once with the capitals of Great Britain and the United States of America with that end in view.

New Mine, Huchow.—A mine has been discovered in Pa-lung-tung, near Huchow, in Chekiang. A local merchant, Mr. Chow Chin-yue, has obtained the sanction of the ministry of agriculture and commerce to exploit the mine with a joint stock company. A preliminary fund of \$200,000 has been raised by the promoters and a stock company with a larger capital will be organized if the investigations prove successful.

Anthracite Coal Mine, Hupeh.—An anthracite coal mine of excellent quality has been discovered in Chang-cha-tung at Ying-chen-hsien, Hupeh. The provincial authorities have undertaken to open the mine and \$50,000 have been appropriated by the Bank of China of Hupeh for the preliminary work. A company will be established later.

Tameka Coalmining Co., Ltd.—Organized with a capital of Y.5,000,000, quarter paid up, to operate coal mines in the Tameka coal field. Office: 7 Nichome, Ginza, Kyobashi-ku, Tokyo. Managing Director: Baron Kilhachiro Okura.

Tsuru Stone Mining Co.—Organized to quarry stone at Tsuru, Yamanashi prefecture. Office: 25 Sanchome, Nishikicho, Kanda-ku, Tokyo. Manager: M. Nara.

OIL

Central Asian Oil Fields.—In 1914 there was produced in the Ferghana region, of Turkestan, 1,800,000 poods (216,000 barrels) of petroleum and four fields were exploited—Shart-Su, Maili-Su, Tchimion, and Sel-Rokho. According to the Russian geological survey, it is considered that there are prospects for developing the oil industry of Ferghana. The needs of the cotton industry and the railroads demand large quantities of petroleum. The largest company is Tchimion (Ltd.), which has a refinery for kerosene and gasoline. Tchimion oil wells are in Skobelev county, 17 miles southeast of the station Vannovskaya on the Central Asiatic Railroad. A pipe line connects the wells with the station.

In connection with the exhaustion of deep levels and high prices for oil there was from 1910 to 1914 a revival of production from hand-dug wells, the depth of which sometimes reached 350 feet. The total amount of such oil in 1913 was 19,000,000 poods (2,280,000 barrels); it was pumped to the principal oil fields or sold on the spot.

Chinese-English Petroleum Company.—Cable advices from Peking state that the Japanese activities in Shensi have not resulted in securing oil concessions, but that a Peking syndicate has formed a Chinese-English petroleum company, for which the preliminary agreement has been filed with the ministry of Agriculture.

Japan's Petroleum Production.—A report from Tokyo states that the production of petroleum in Japan during 1919 amounted to 76,714,000 gallons. The quantity, in gallons, produced by each field was: Ishikari, 201,000; Akita, 31,761,000; Niigata, 44,434,000; and Taiwan, 318,000.

Spirit & Co.—Organized for the manufacture and sale of lubricating oils. Office: 14 Kitadori, Yedobori, Nishi-ku, Osaka. Manager: K. Otsuka.

Japanese in Mexico.—The Nippon Petroleum and Hoden Oil Companies are negotiating for the purchase of certain oil fields in Mexico and have already paid over the price for the prospecting rights. Engineers and drilling are expected to be sent to Mexico in the near future.

PUBLIC WORKS

Municipal Expansion Plans, Japan.—The home department has approved the general plans for the extension of the municipal limits of the six capital cities. The area of Tokyo will be 190 square miles or six times greater than the present city. Osaka will be extended to 110 square miles, taking in 70 small villages including Sakai City, or about six times the present size. Kyoto's total area will be 150 square miles taking in 57 villages, or thirteen times the present size. The total area of Kobe will be 43 square miles including 8 outlying districts or three times its present area. Yokohama will be 60 square miles taking in 13 outlying districts, or five times its present size. Nagoya will have a total area of 70 square miles

taking in 20 outlying districts, or four and a half times its present area.

Development Plans, Mergui.—The government has sanctioned the following schemes for the development of Mergui, Lower Burma. The reclamation of the foreshore for a distance of 1 mile; the estimated cost being 24 lacs of rupees. The water supply for the town, which is now dependent on wells which dry up about April. The question of hydro-electric power scheme for lighting the town is being discussed. A railway between Mergui and Siam, to join up with the Siamese Railways to Bangkok; this line will open up a large tract of country at present without roads, and will certainly enhance the value of the Thabawleik mines, the proposed alignment running through their area.

Philippine Public Utilities.—New public utilities owned and run by government agencies are registered in the public utility commission. At the close of 1919 the number of government agencies operating as public utilities was as follows:

Steamers.—Department of Mindanao and Sulu—the provincial boards of Leyte, Mindoro, Cota-

bato, Bohol, Cebu, Agusan, Lanao, Palawan, Cagayan, Davao, Romblon and Zamboanga; bureau of commerce and industry.

Automobiles.—The Benguet Auto Line, bureau of public works.

Wharves and Docks.—The municipal councils of Romblon, New Washington, Capiz, and Butuan, Agusan; the department of Mindanao and Sulu; the provincial governments of Surigao, Bohol, Misamis, Mindoro and Davao.

Ice.—The insular ice plant and cold storage.

Irrigation.—The municipal governments of Rosales, Pangasinan; San Fabian, Pangasinan; Abulog, Cagayan.

Electric Light.—The city of Baguio; the provincial government of Pangasinan; and the municipal government of Taal, Batangas.

Water.—The metropolitan water district, Manila; the city of Cebu; and the city of Iloilo (projected).

Sewer.—The metropolitan water district, Manilar.

Telephones and Telegraph.—The bureau of public works (Benguet); the provincial governments of Nueva Ecija, Pampanga, Oriental Negros, Zambales, Bohol, Iloilo, Laguna, Misamis, Occidental Negros, Rizal, Tarlac, Tavabas, Abra, Lanao, Cotabato, Bulacan, Mountain Province, La Union, Bataan, Albay, Davao, Palawan, Batangas, and Ilocos Sur; Bukidnon government telephone system; Ilocos Norte telephone system; provincial telephone line, Pangasinan; Zamboanga telephone system; the municipal governments of Hilongos, Leyte; Tuburan, Cebu; Gonzaga, Cagayan; Aparri, Cagayan; Sogod, Leyte; Villaba, Leyte; Kawayan, Leyte; and Libagon, Leyte.

Public Works, Korea.—For the purpose of building an embankment on the Han River at Yongsan Y.129,600 will be allotted in two consecutive years beginning next fiscal year, the instalment for 1921 being estimated at Y.64,800. A total sum of Y.555,158 was at the same time set apart in the budget estimates, with a view to granting aid to the waterworks at Chongju, Kongju and Chinnampo, and the street-improvement works at Fusan and Keumipo, as well as to the irrigation works at Yongsan.

Public Works, Ceylon.—The Ceylon government has published the first draft of a proposed ordinance to make provision for a loan of £6,000,000 to be applied to certain new public works and the extension of those already undertaken. The repayment to the general balance of the colony of sums advanced therefrom to the municipal council of Colombo for construction of the Colombo drainage works and the extension of the Colombo waterworks will absorb £1,420,000 of the loan. The remainder will be spent on railway and station extensions, oil, and lake development, and other works of development. The various public works of Ceylon are in charge of the director of public works. Railway extension, however, is under the direct control of the general manager of the Ceylon government railways. All supplies for either of these departments are purchased through the crown agent in London, although recommendations go forward from the local departments interested.

Indo-China Public Works.—The Saigon harbor improvements are to be extended to Cholon, a suburb of Saigon; and similar works are to be undertaken at Haiphong, Tourane and at Kwang-Chau-Wan. This last-named territory, covering some 400 sq. miles, was leased to France by China in 1898. It is also intended to carry out the continuation of the Saigon-Tourane railway line to Haiphong. In introducing the proposals to the

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authorities at Paris, M. Long, the governor general of Indo-China, expressed the belief that a loan covering a large part of the cost could be raised in Indo-China.

RIVERS AND HARBOR, IMPROVEMENTS, WHARVES, DOCKS

Grand Canal Dredging.—Merchants of Wusih and Kaingyin will dredge the section of the Grand Canal from the Great Lake to the Yangtze River, a distance of approximately 100 *li*. The canal is being silted up and it will be necessary to dredge it along its entire length and reconstruct the embankments. Two branch waterways and a dike are included in the project. The total cost of the work is estimated at \$1,000,000 and an effort is being made to raise the amount by appropriations and subscriptions.

Chefoo Breakwater.—The breakwater for Chefoo Harbor, in accordance with plans to make this north China port thoroughly modern in every respect, has been completed.

The breakwater is approximately at its full height and protected by heavy rubble on the slopes for a length of about 3,200 feet. A total length of 17,000 feet of parapet wall has been built. Work on the mole involved the depositing of 194,000 cubic yards of sand, 167,000 square yards of brushwood zinkstucks and 64,500 tons of rubble in the foundations and lower part and nearly 173,000 tons of rubble in the upper part.

The reinforced concrete caisson for east end of the quay was sunk successfully and filled with concrete and the large masonry blocks in the quay wall and the wing walls have been put in place. About one-half of the masonry superstructure remains to be constructed.

Dutch Expert for China.—The Dutch minister to Peking has suggested to the Chinese authorities

the employment of Dutch experts for the improvement of riparian work as a method of promoting foreign trade. He assures the Chinese that Dutch capitalists would be pleased to make any necessary advances to China for the purpose. Acting on this advice the Chinese government has decided to employ a Dutch expert.

Enoura, New Naval Port, Japan.—The construction of a naval port at Enoura, Shizumura, near Numazu at an estimated cost of Y.15,000, which has been under contemplation at the navy office is to be commenced shortly, says a Numazu dispatch to the *Kokumin*.

According to the proposed plan, a tunnel will be excavated through Washizusan, a hill surrounding the village of Enoura, and two wharves will be constructed at Okubo Cape and Sakazure.

New Deckyard, Penpu.—A dockyard will be built at Penpu, an important station on the Shanghai-Nanking Railway, situated on the southern bank of the Wei river, Anhuei, by the general chamber of commerce of Penpu and local Chinese municipal authorities. The work is expected to be completed in June of this year.

San Men Wan Reclamation.—The bureau organized for the preliminary reclamation work at San Men Wan, on the coast of Chekiang north of Wenchow, has been abolished, and placed under the provincial government of Chekiang. A plan to organize a reclamation board to carry out the work on the capital invested by overseas Chinese is under consideration.

River Improvement, Kanagawa, Japan.—The home department has assisted the Kanagawa authorities by the appropriation of Y.417,500 for the improvement of the Tama River during 1921.

Harbor Improvement, Japan.—The home department has set aside the sum of Y.1,310,000 for harbor works in 1921, distributed as follows: Yokkaichi Harbor, Miye Prefecture, Y.270,000; Funakawa Harbor, Akita Prefecture, Y.230,000;

Shiogama Harbor, Miyagi Prefecture, Y.250,000; Aomori Harbor, Aomori Prefecture, Y.30,000; Niigata Harbor, Niigata Prefecture, Y.80,000; Nagasaki Harbor, Y.250,000; Nagoya Harbor, Aichi Prefecture, Y.200,000; Hana Harbor, Okinawa Prefecture, Y.150,000.

New Kure Dock.—The Japanese navy department has decided to construct a dock at Kure which will be large enough to accommodate a warship of the 40,000-ton class. It is expected that the construction work will take about three years, and when it is completed the 8-8 squadron will be perfectly equipped.

New Kiangnan Dock.—Plans have been drawn up for a new dry dock at the Kiangnan Dock and Engineering Works, Shanghai, says the Chinese Press. Work will commence shortly on the new dock which will measure 500-ft. long and 200-ft. deep.

Hongkong Reclamation.—Tenders are invited by the government for reclaiming approximately 90 acres of the Praya East foreshore with materials obtained by cutting down Morrison Hill; protecting the area so reclaimed by sea and quay walls; constructing sewers, stormwater drains, reinforced concrete piers, refuse-boat pier, retaining walls and temporary and miscellaneous works.

RAILWAYS

Locomotives for F.M.S.—Consul H. J. Dickinson reports from Singapore, Straits Settlements, that orders have recently been placed in the United States for twenty American-made locomotives for use on the Federated Malay States railways, their use in the past having given every satisfaction. Ten of these locomotives will be delivered at Penang and ten at Singapore.

British Locos Arrive.—The s.s. *Pembroke* brought 1,000 tons weight of locomotives, built

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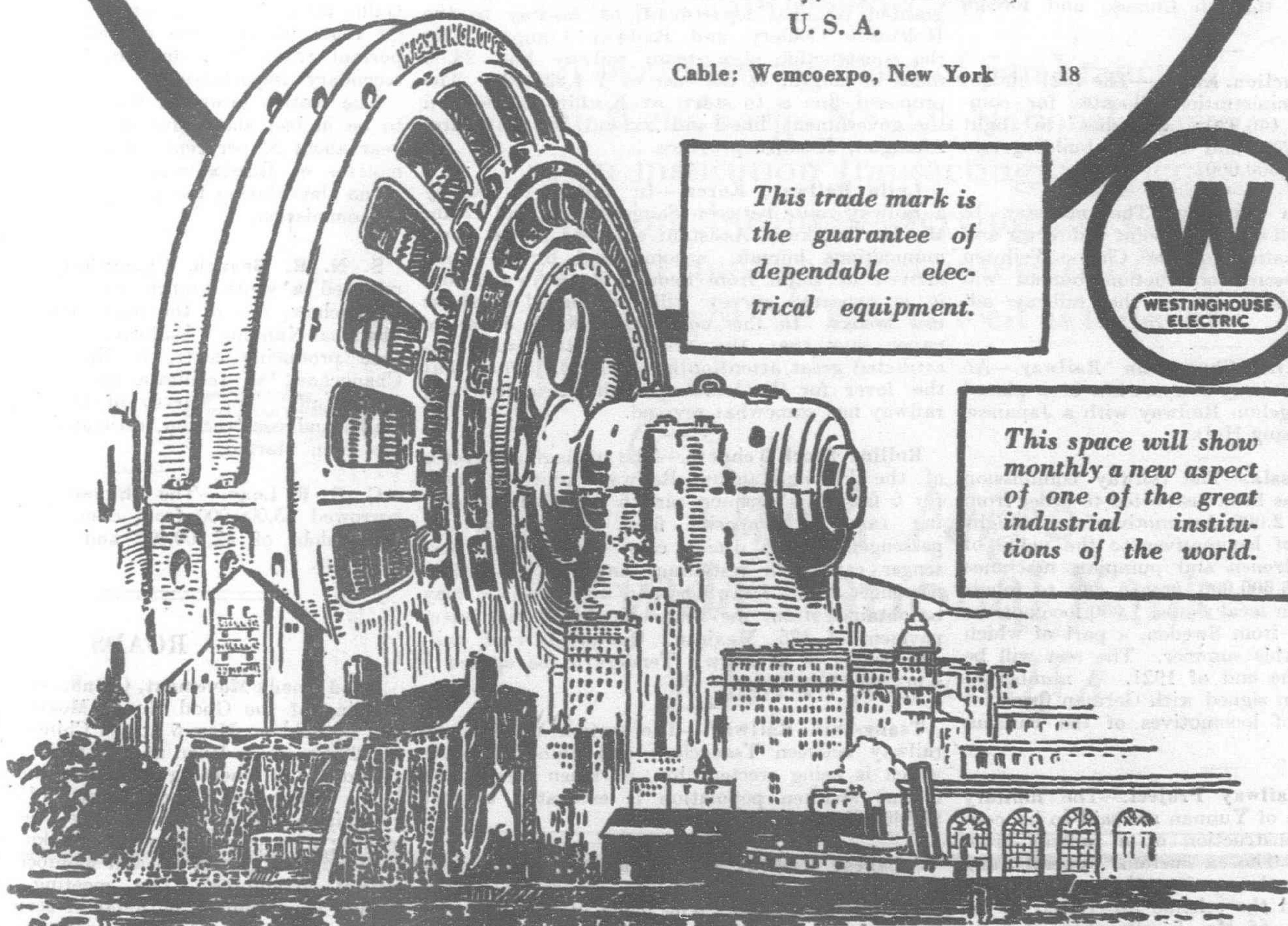
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in the United Kingdom for the Chinese government railways. These will be unloaded at Woosung and assembled at the S.N.R. shops. This is the third consignment of British-built locomotives which have already arrived, and others will follow.

C.E. Railway Board.—The British, French, Japanese and American governments have commenced discussions with a view to the creation of an international administration for the Chinese Eastern Railway, this administration to be in the nature of a trust, rather than of a receivership, until Russia recovers and is once more recognized by the powers.

It is not stated which of the four powers proposed the plan for international administration of the Chinese Eastern Railway, but all of them are interested in it, either on economic grounds or because they have advanced money to the railway and hold its bonds. It is understood that the internationalization plan would have the effect of neutralizing the Chinese Eastern Railway pending the time when Russia can once more undertake the control and operation of the line.—*China Press.*

Canton-Hankow Railway.—Mr. Hsu Sung-hao, managing director of the Canton section of the Canton-Hankow Railway proposes to complete the upper section to Ping Shek by floating a loan of \$20,000,000, to be secured by the constructed section of the line, a distance of approximately 460 *li* or 139 miles.

Kiukiang-Nanchang Railway.—A recent decision has been made by the directors of the Kiukiang-Nanchang Railway, to turn the line over to the ministry of communications to become a part of the Chinese government railways. The action is a result of the possible foreclosure on the part of a Japanese syndicate which is said to have loaned more than \$20,000,000 to the management. The ministry of communications has not as yet indicated its willingness to take over the line and assume the indebtedness. Protests are being made by the Japanese interested.

Suiyuan-Paotaochen Railway.—The Peking-Suiyuan Railway Administration has petitioned the ministry of communications to build a line from Suiyuan to Paotaochen, a distance of 300 miles, and to raise the needed capital of \$5,000,000 by issuing bonds through Chinese and foreign banks.

Railway Construction, Korea.—The 1921 budget of the Chosen administration allocates for communications, Y. 1,466,920; subsidies to light railways, Y. 380,850; and railway building and improvement, Y. 6,500,000.

Chefoo-Weihsien Railway.—The ministry of communications will shortly appoint a director and form an administration for the Chefoo-Weihsien Railway. The present construction bureau will become a department under the railway administration.

Sleepers for Kirin-Changchun Railway.—An order for 150,000 railway sleepers has been placed by the Kirin-Changchun Railway with a Japanese firm (the Ta Po Shang Hui).

Locos for Russia.—The railway commission of Soviet Russia has been instructed to order from foreign countries 2,000 locomotives for freight trains and parts of locomotives to the value of 60,000,000 Swiss *kronen* and pumping machines to the value of 15,600,000 *kronen* and to repair 4,000 locomotives in local shops. 1,000 locomotives have been ordered from Sweden, a part of which will be ready by this summer. The rest will be delivered before the end of 1921. A number of contracts have been signed with German firms for the construction of locomotives of the Russian type.

Mengtze-Boyi Railway Project.—The military and civil governors of Yunnan are said to be contemplating the construction of a railway from Mengtze to Boyi. The ex-Tuchun, General Tang Chi-yao, proposed the construction of this line last November and the scheme progressed so far as the nomination of Mr. Lo Pei-chin, the ex-

civil governor, as director. It is understood that the new civil and military governors will authorize Mr. Lo to continue with the project.—*Reuter.*

Chuchow-Pingkiang Railway.—General Chou Heng-ti, commander-in-chief, in Hunan, and General Chen Kuang-yuan, Tuchun of Kiangsi, have agreed to co-operate in the construction of the Chuchow-Pingkiang Railway. The railway passes through the two provinces and the scheme, agreed on, provides that each of the parties to the agreement shall undertake the construction of the line in his own province. General Chen Kuang-yuan has telegraphed to the government, asking for its sanction for the proposal.—*Reuter.*

Siberian Coal Mine Railway.—A Harbin despatch to the *China Advertiser* says:

"In accordance with the proposal of the department of communications, the Far Eastern government has decided to build a branch line to Kharialchinsk(?) at the estimated cost of 100,000 gold roubles."

Japan's Railway Program.—The amount earmarked for railway improvement during the current year is roughly Y.141,092,400, of which 65 million yen will be spent for construction, to be appropriated in the following order:

To the Tokyo Railway Bureau...	Y. 8,700,000
„ the Kobe Railway Bureau ...	7,000,000
„ the Nagoya Railway Bureau	5,500,000
„ the Moji Railway Bureau ...	6,800,000
„ the Sendai Railway Bureau...	6,800,000
„ the Sapporo Railway Bureau	5,000,000
„ the Kobe Improvement Office	6,200,000
„ the Tokyo Improvement Office	11,000,000
„ the Atami Line	8,000,000

Kung-Chang-Lin Railway.—The Peking Jih Pao is authority for the announcement that the Mitsubishi Company, is negotiating with the authorities of Mukden for permission to operate the Kungchang-lin iron mine and to build a railway from Mukden to Kung-chang-lin for the transportation of coal. Since the proposed railway passes through a mountainous section, involving great expense in its construction, it is proposed that it be built under Sino-Japanese joint control. The intention is to extend the line later to Liangyang, where extensive iron mines abound.

New Railway, Hokkaido.—A charter has been granted by the department of railway to the Hokkaido Colliery and Railway Company for the construction of a steam railway line, 28.50 miles in length, at the cost of Y. 1,830,000. The proposed line is to start at Kushiro Station on the government lines and extend to Shitakara, Akangun, Kushiro province.

Lajin Railway, Korea.—In order to survey a railway route between Sangsampong and Lajin, Mr. H. Takakura, Assistant engineer in the communications bureau, accompanied by 13 men, arrived at Lajin from Seoul a few days ago, and it is expected survey will be finished in about two weeks. In this connection, local Japanese paper says that the arrival of the party has attracted great attention in the locality now that the fever for the building of the Kirin Hoilyong railway has somewhat revived.

Rolling Stock Tenders.—The managing director of the Peking-Hankow Railway invites tenders for 6 first-class sleeping cars, 6 second-class sleeping cars, 6 composite first and second-class passenger cars, 6 dining cars, 6 third-class passenger cars with restaurant and 10 third-class passenger cars. Drawings and specifications may be obtained from the head office at Peking upon payment of \$25, Mexican. Quotations c.i.f. railway wharf at Hankow. Tenders to be opened 3 p.m. on July 1st.

Tsang-shih Railway.—The section of the new railway between Tsangchow and Shihchia-chuang which is being erected by workmen from the famine stricken population is estimated to cost \$1,840,000.

Japanese Railway Extensions, 1921.—The lines projected by the department of railways for 1921 total 260 miles. The name of the line and approximate date of completion is here given:

Kohama line, 12 miles, April; Matsuda line, 10 miles, June; Saijo line, 16 miles, June; Hidari-zawa, 8 miles, June; Hoshiba line, 9 miles, June; Nichibu Minami line, 14 miles, June; Joitsu Minami line, 13 miles, July; Ikiho line, 10 miles, July; Hamada line, 9 miles, August; Yamano line, 14 miles, Aug. : Nemuro line, 6 miles Sept. : Joitsu Kita line, Sept. : Somo line, 10 miles, Sept. : Minato line, 17 miles, Sept. : Hidari Sawa line, 2 miles, Sept. : Naylor line, 17 miles, Sept. : Hoki Kita line, 5 miles, Sept. : Netsu Naka line, 10 miles, Nov. : Takayama Line, 8 miles, Nov. : Masuda line, 5 miles, Nov. : Yokoguro East, 4 miles, Mar. 1922 : Yokoguro west, 5 miles, March : Hidari Sawa line, 5 miles, March : Nichibu north, 6 miles, March : Nichibu south, 18 miles, March : Hosojwa line, 2 miles, March : Sugiyasu line, 3 miles, March.

Peking-Suiyuan Extension.—To finance the construction of the extension from Suiyuan to Paotowchen, the Peking-Suiyuan Railway has decided to issue short-period domestic bonds to the amount of \$5,000,000. The general conditions on which the bonds are issued are:

1. Interest will be 7½ per cent. annually.
2. Redemption begins with the second year at \$1,250,000 for four successive years.
3. The entire revenue of the Peking-Suiyuan Railway will be the security.
4. The subscription will end on the 30th May.

Materials will be purchased in May and tenders for the construction are invited. The work, it is hoped, will be started before the end of the year.

The section from Pingtichien to Suiyuan, a distance of 300 *li*, has been finished in less than a year, despite adverse climatic conditions.

F. M. S. Railway Receipts, 1920.—The railway receipts last year from all sources amounted to \$17,316,000, an increase of 15.8 per cent. over 1919. Expenditure amounted to \$16,103,000 compared with \$11,286,000 in 1919, an increase of 42.6 per cent. The nett earnings were \$1,213,000 or less than 1 per cent. on the capital invested in the railway up to December, 1920, viz., \$144,000,000.

Railway Conditions in Russia.—According to the Russian Soviet press there are now thirty-one railways in Russia that have suspended traffic altogether as a result of the fuel famine. Of these nineteen are classed as major or important trunk lines and the other twelve are of secondary importance.

The motive power of the railways is also said to be in bad shape, for at the beginning of this year about 58 per cent. of the ten thousand locomotives of Russia were out of commission, and at no time during the past year were 50 per cent. in commission.

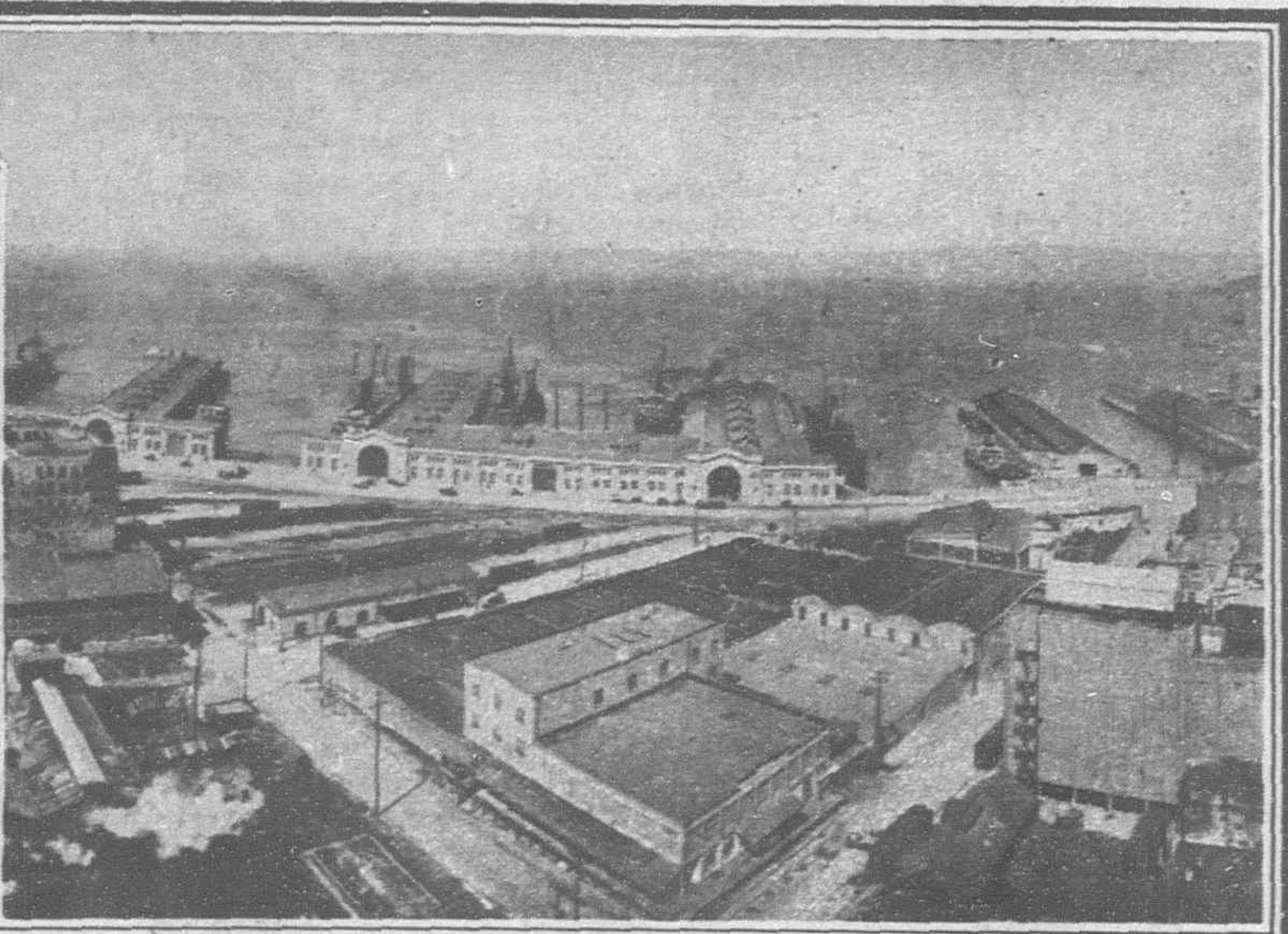
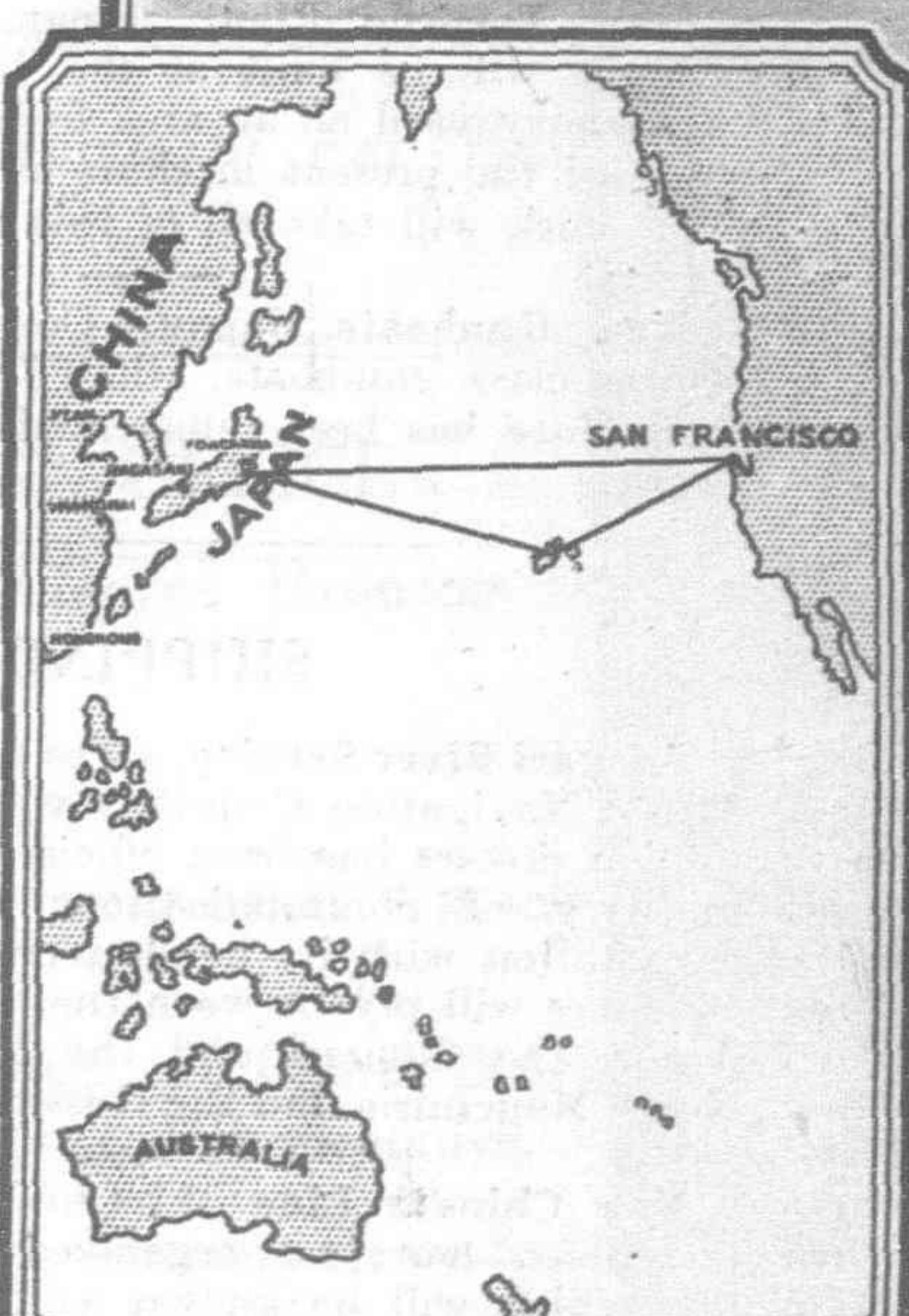
S. N. R. Branch, Changchow.—As previously reported a short branch line will be built from Changchow, one of the important stations on the Shanghai-Nanking Railway, to Chi-tze-yan, a food producing centre in the neighborhood of Changchow, to facilitate the transportation of food stuffs. The survey of the line has been made, and construction, estimated to cost \$10,000, has been started.

C. E. R. Loan.—The Chinese Eastern Railway borrowed \$3,000,000 from domestic banks to pay off a debt of \$2,000,000 and to defray other expenses.

ROADS

Good Roads Movement, China.—The first annual meeting of the Good Roads Movement of China will be held on May 5 at the Chinese Y. M. C. A. at 120 Szechuen Road at 5.15 p.m. The date and purpose of this meeting have been announced by Dr. C. T. Wang, who is the chairman of the executive committee and invitations have been sent to the leading men of Kiangsu and Chekiang provinces, including the governors and members of the provincial assemblies. The meeting proposes to launch a movement national in scope and which will claim the support of every person interested.

U.S. DEPOSITORY



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in China. Already many letters have been received from all over the world asking for more news of the Good Roads Movement.

At the May meeting, a constitution will be presented for adoption, officers for the organization will be elected, and the purpose and plans of work will be outlined. Reports of various committees will be received, including that of the Exhibition Committee, headed by Mr. C. C. Nieh, which is planning for a big exhibit of road materials and machinery. A map is being sent with each invitation to the meeting and this shows the proposed route for the road from Shanghai via Hangchow to Nanking. It was drawn up by the survey committee headed by Mr. Sidney J. Powell.

Tehchow-Lintsing Highway.—The Shantung highway constructed as a famine relief measure by the American Red Cross is now practically complete.

This highway runs from Tehchow to Lintsing, with a branch from Enhsien to the railway line at Ping Yuan.

Chefoo-Weihsien Road Extension.—Since the completion of the Chefoo-Weihsien road, the merchants and officials of Chefoo have decided to extend the course of the highway to Weihsien and Haiyang by way of Chaoyunan and Laiyang. A \$300,000 fund from the Chefoo Sea Dyke Bureau is to be used to finance the project.

Rubber Roads, Singapore.—Permission has been granted to the municipal engineer at Singapore to build one or more roads of rubber to determine whether this product has more enduring qualities than laterite and other road materials. The municipal engineer claims that a road built of rubber in England 45 years ago is still in as good condition as when laid. In the past it has been the custom to vulcanize the rubber onto steel plates measuring 9 by 3 inches but it is thought that to vulcanize the rubber onto concrete piles will prove as durable and be much less expensive.

Dairen-Port Arthur Road.—Surveys for a road to be built between Dairen and Port Arthur have been started. The road will be from 30 to 50 feet in width, approximately 21 miles long, will contain two tunnels, and cost more than Y.1,500,000 gold. It will be built along the seacoast, and is to be confined entirely to the use of motor cars or rubber-tyred carriages.

Chekiang-Anhwei Motor Highway.—The projected motor highway between Huchow, Chekiang province, and Kwangtung, Anhwei province, a length of 50 li, has become a possibility, \$300,000 having been raised by the gentry of the districts for its construction. One hundred and fifty thousand dollars will be used for the construction of the road, \$100,000 for the purchase of motor cars, and building three stations and \$50,000 will be placed in a reserve fund.

Road Building, Mokanshan.—The Shanghai-Hangchow-Ningpo Railway board is building a modern road ascending from the foot of Mokanshan to its top. Although this road was built last year its width and gradient is not adapted to automobile traffic. A road will also be built between San-jao-pu and Yu-chun. Surveyors are being made.

Nantungchow City Road.—The construction of the three main roads, joining Haimen in the eastern and southern directions and Hsukao in the northwestern direction, and five branch roads, of a total length of 500 li, will be completed before May 22nd, 1921.

Road Building, Soochow.—A modern road, 20,000 feet long, is being built from Soochow to Hochou Hill, at an estimated cost of \$12,000. The funds were raised by subscriptions from Shanghai merchants.

Chong-shih Road, Chihli.—It is reported that the preliminary costs of the Chonghsien-Shihchachong road, Chihli, is estimated to be \$1,840,000. A sum of \$200,000 was donated on April 27th, 1921 by the ministry of communications to the work department of the Chong-Shih road for purchasing land.

Chefoo-Weihsien Road.—The work of the building of the Chefoo-Weihsien road, Shantung, will be completed in May of this year.

Road Development by Red Cross.—The Red Cross road-making proceeds apace. There are two roads in process of completion, one from Yangchuan on the Chengtai Railway to Liao-chow (a distance of over 80 miles) and the other from Pingyao to the Yellow River (a distance of over 100 miles.) The Shansi Famine Relief committees also has under construction a new road from Taiyuanfu to Chin-su, a place of historic interest. This is only about 12 miles long. There are, however, other plans for continuing this road as far as Fenchowfu and on towards the Yellow River, another 50 miles to the south-west. All this roadbuilding, coupled with the schemes of the Shansi government, is going to make Shansi much more accessible for travelers.

SHIPBUILDING

Shipbuilding, Japan.—There are now in Japan only 19 shipbuilding companies capable of constructing vessels of more than 1,000 tons gross, while there were over 70 during the war. The depression of the shipping trade is most acutely felt in the shipbuilding industry, and it is feared that some of the existing companies will have to close down or be absorbed by other concerns.

The recent fall in prices of vessels has caused the cancellation of many contracts. It is considered advantageous to pay compensation for canceled contracts and to make new ones. Construction costs are now roughly estimated at Y. 100 per ton for cargo-boats. During December three steamers aggregating 10,650 tons were launched from as many shipyards. The Nippon Yusen Kaisha has recently placed an order for the construction of three 10,000-ton steamers.

At present there is no particular protection for the shipbuilding industry, although assistance of some sort is needed. The government in considering this phase seems to be inclined toward abolishing the import duty on steel, timber, machinery and other shipbuilding accessories that are difficult of production in Japan.

Launching at Saigon Dock.—On the 7th of April was launched the steamer *Albert Sarraut*. The dimensions are: Length, 90 metres; breadth, 12 metres; displacement, 3,100 tons; tonnage, 5,000.

The launching operation was effected most successfully before an immense concourse of spectators applauding this first manifestation of the creative power of the Saigon Dock.

Fukien Dockyard.—The Fukien Dockyard which is undertaking the repairing work for all the warships of this country is now asking the government for a subsidy in order to enable the authorities there to make both ends meet, as they have recently been suffering financial difficulties. It is reported that the request will probably be complied with by the government, as the ministry of the navy has decided to draw thirty thousand dollars a month from the proceeds collected as rent from the chartering of the ex-German and Austrian ships as a subsidy for the dockyard.

Ice Breakers, Japan.—The war office has decided to construct several large ice-breakers. This decision has been reached following the trial of the ice-breaker *Baikal*. When completed, these large ice-breakers will be used in maintaining communication with Saghalien in winter time.

New Fusan Ferry Steamers.—The department of railways has started its endeavors to improve the ferry service between Japan proper and Fusan, Chosen, by building two new boats for that service. Keels will be set about March 15th at Kobe for one of them to cost Y.3,000,000.

New Fishery Steamers.—Two new ships of 300 tons each will be built to the order of the department of agriculture and commerce in Japan at a cost of Y.550,000. The ships will be used for investigations in fishing waters.

Launching, Yokohama Dock.—A new vessel of 10,000 tons will be launched from the Yokohama Dock shortly. She will have a speed of 12 knots.

New Steamers, March, Japan.—Four new steamships were launched during the month of March in Japan, the *Matsuye Maru*, 7,280 tons, from the Yokohama Dock to the order of the N.Y.K.; the *Busho Maru*, 2,700 tons, from the Osaka Iron Works to the order of the O.S.K.; the *Iwate Maru* of 5,000 tons from the Mitsui Bussan Kaisha yards for private account and the *Koki Maru* of 5,600 tons from the Ishikawajima Yards to the order of Suzuki & Company. The total for the month is 21,380 tons and for the year commencing January 14 steamers totalling 78,620 tons.

New Torpedo Plant, Japan.—A new torpedo factory will be built at the Hiro branch of the Kure navy yard on an area to be reclaimed located west of the present machine shops. The reclamation work will take all of this year.

New Gunboats, Japan.—Construction on four second-class gun-boats, the *Seta*, *Katada*, *Hira* and *Hozu* has been commenced at the Kure Navy Yard.

SHIPPING

Sungari River Service.—The reorganized Wutung Steam Navigation Company with a capital of five million dollars has been officially registered in the ministry of communications as a semi-official corporation with its headquarters at Harbin. Its steamers will ply between the various ports of the Amur, the Sungari and the Nunkiang rivers in North Manchuria and the Russian Far East shortly.

New Chinese Line.—Li Chuen-tai, a Cantonese merchant, has just organized a new steamship line which will be known as the Kongkow S. S. Co. Offices have been rented at No. 13 Foochow Road, and a 1,600-ton steamer has been purchased which will run between Shanghai, Hinghwa, Chin-chow and Foochow.

New Chinese Company, Shanghai.—A new navigation company is being organized at Shanghai by Mr. Y. K. Chu, and Mr. P. H. Chang, Chinese resident at Formosa, to run steamers between Shanghai, Fukien, Chekiang and other Chinese coast ports.

Toyo Kisen Kaisha.—An ordinary general meeting of shareholders of the Toyo Kisen Kaisha was held on 29th March, when a decision was reached to issue debentures to the value of 7 million yen through the Yasuda Bank and the following accounts for the last business term were ratified:

	Y.
Net profits	385,120
Brought over from preceding term	120,169
Amount transferred from dividend	
equalization fund	70,000
Total	1,205,290
Reserves	20,000
Dividend (10% per annum)	1,137,504
To be carried forward	47,794

New Steamer for C. M. S. N. C.—A new steamer launched in March has been built by the Yah Sung Shipbuilding Yard, Shanghai, to run between Shanghai, Changsha and Ichang under the flag of China Merchants' Steamship Navigation Company.

Chinese Shipping Expansion.—The Chien Shing Shipping Company, Shanghai, has added three steamers between Shanghai and Fukien, Shinghsia, Chienchow, etc.

WATERWORKS

Waterworks Expansion, Shanghai.—The Shanghai Native City Waterworks Company has ordered a new pumping equipment of 12,000,000 gals. daily capacity. The plant can supply 10,000,000 gallons but its rapid expansion has necessitated the installing of machinery of greater capacity.

Waterworks, Wuchow.—A water-works company is shortly to be established in Wuchow, with a capital of \$1,500,000. As soon as the ministry of agriculture and commerce authorizes the registration of this company, they will start operations.